Annex D: Materiel

Introduction

This annex provides a brief description and status of key Army materiel programs contained in the FY07 President's Budget (PB07). These programs develop and field new equipment systems, provide incremental improvements to existing systems, or recapitalize existing fielded systems by rebuilding to a zero-miles/-hours condition and upgrading system capabilities.

These materiel programs are part of a comprehensive and integrated doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) modernization solution to execute two of the Army's key strategies: (1) providing relevant and ready land power capability to the Combatant Commander as part of the joint team, and (2) training and equipping our Soldiers to serve as Warriors and growing adaptive leaders who are highly competent, flexible and able to deal with future challenges.

The Acquisition Phases and Developmental Processes

The materiel programs described in this annex are in various phases of the acquisition management life cycle. Figure D-1 depicts the acquisition management process and management milestones. Both the new and old terms are provided because programs initiated under the old life-style model still use those terms. Definitions for these phases and

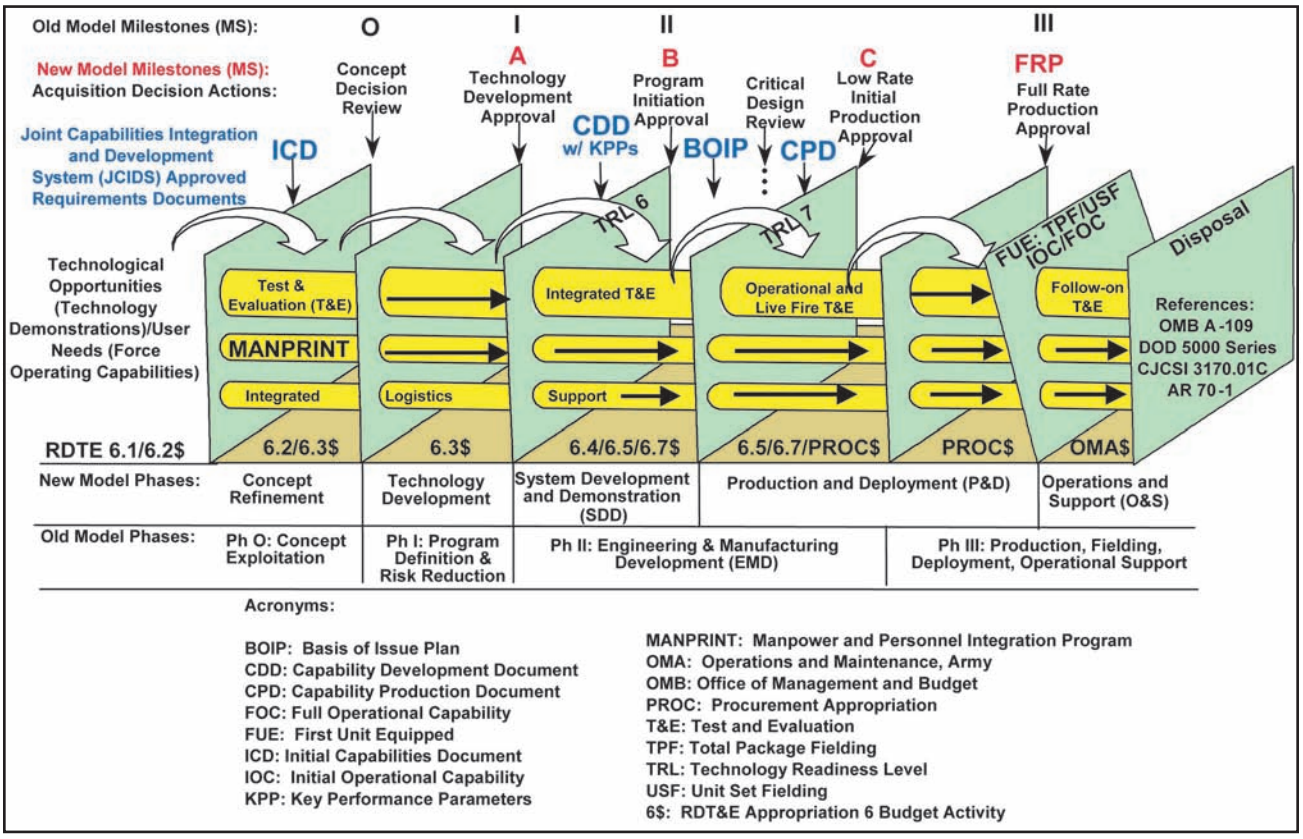


Figure D-1. System Acquisition Management Process

other acquisition terms can be found in the Department of Defense (DOD) 5000 Defense Acquisition Policy documents.

Evolutionary acquisition is the DOD-preferred strategy being used by the Army to rapidly acquire materiel systems with mature technologies for the user. This strategy delivers capabilities in increments, with the recognition that future improvements in capability will be needed. The objective is to balance needs and available capability with resources, and to put capability into the hands of the user quickly. Success of this strategy depends on consistent and continuous definition of requirements, maturation of technologies, and continuous collaboration between the user, tester, and developer to develop and produce systems with increasing capability towards a materiel concept. Figure D-2 depicts this requirements and acquisition process.

Evolutionary acquisition uses two key processes, incremental development and iterative development and insertions, to provide for continuous discovery and development of technology for military applications that enhance Joint Force capabilities.

Through the incremental development process, a desired capability is identified and the required end state is defined. That requirement is met over time by the development of several increments, each dependent on available mature technology. The requirement for future increments is based upon the ability to fill the gap between the current capability and the objective capability (100 percent design concept) for a system.

Through the iterative development and insertion process, a desired capability is identified, but the end-state requirements are unknown

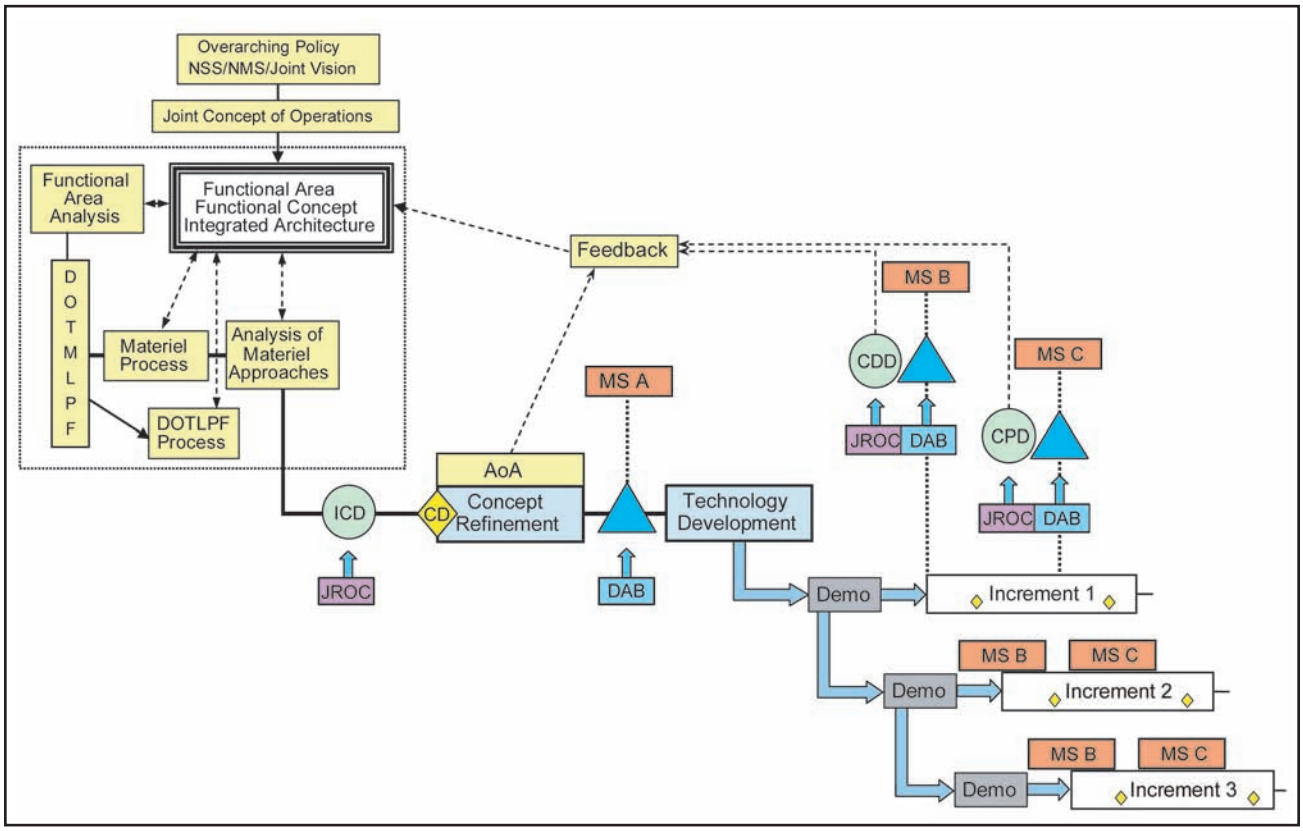


Figure D-2. Requirements and the Acquisiton Process

at program initiation. Those requirements are refined through experimentation, risk management, and continuous user feedback to provide the best possible capability within an increment. The requirement for future iterative development and insertion depends on user feedback and technology maturation.

Both incremental and iterative development and insertion require close coordination between materiel and training developers to ensure training products and plans are developed to support the new capabilities provided by each increment and any iterative developments and insertions applied outside an increment cycle to existing systems.

Developing Capabilities for the Future Joint Force

The Army is modernizing its current modular force to remain a relevant and ready component of the Joint Force that meets near-term operational challenges while continuously pursuing truly transformational changes to develop a future combat force over time. The Joint Capabilities Integration and Development System (JCIDS) is the top-down joint capabilities-based requirements generation process that guides Army and the other Services' investment in transformational capabilities for the future Joint Force. The overarching Capstone Concepts for Joint Operations (CCJO) is the first step in this process that translates strategic guidance to desired joint capabilities. It is an overarching concept and construct that provides the operational context for transformation by linking strategic guidance with the integrated application of Joint Force capabilities. The CCJO describes how the Joint Force intends to operate across the range of operations from 2012 to 2025 (Figure D-3).

The CCJO is a unifying framework for developing supporting Service concepts, subordinate joint operational, functional, and enabling concepts, and a set of integrated operational, technical, and system architectures that look at existing, evolving and future Joint Force requirements. These concepts and architectures will be validated through joint analysis, experimentation and lessons learned to guide future joint- and Service-led modernization efforts.

Joint Functional Concepts

There are six appendices to this annex. Each appendix is aligned with one of the functional concepts of force application, protection, focused logistics (FL), battlespace awareness (BA), command and control (C2), and net-centric. Each functional concept describes the approach for providing a par-

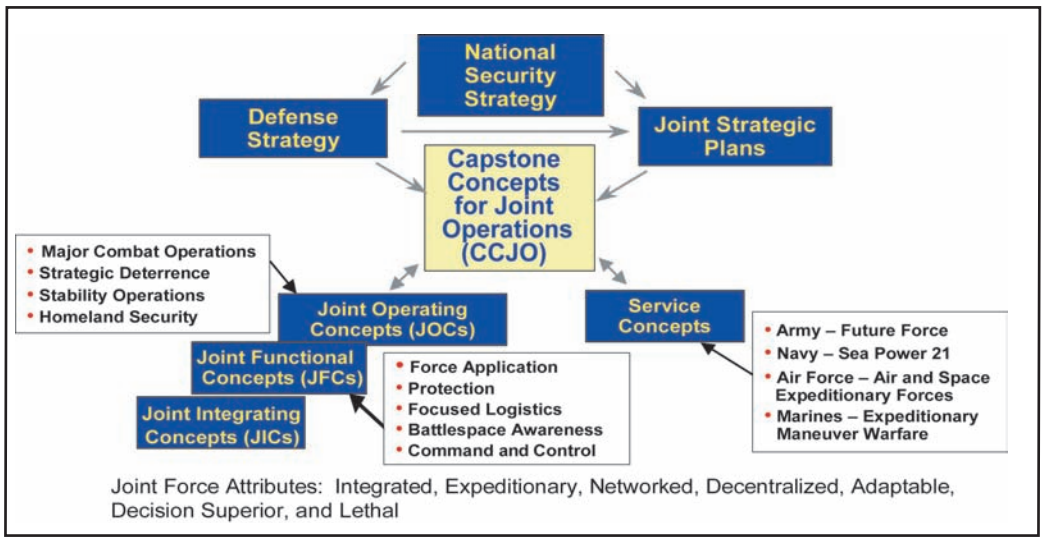


Figure D-3. Capstone Concepts for Joint Operations Framework

ticular military capability across the range of military operations. Under JCIDS, the Joint Staff J8 is using these functional capability categories to focus joint analysis. Programs that provide more than one functional capability are assigned a lead Joint Warfighting Capability Assessment (JWCA) team with one or more supporting JWCAs to do the analysis up front of proposed concepts and DOTMLPF solutions. A designated Functional Capability Board (FCB), which is also aligned with one of these emerging Joint Functional Concepts, validates this analysis and forwards recommendations to the Joint Requirements Panel and Joint Requirements Oversight Council (JROC) that provides top-down guidance and direction to the Services on their modernization programs.

In this annex, Army materiel programs with more than one functional capability are described only once within a functional capability appendix that best follows the current portfolio of the six FCBs described below and as aligned in the equipping resourcing framework used to organize the Army equipping program.

Force application capabilities are those that cause an effect on the enemy. The force application FCB portfolio includes land, maritime, information, space, psychological, deception, and special operations; joint targeting and fires; conventional, nuclear and electronic attack; and suppression against enemy air defense. **Appendix 1, Force Application**, provides a description and status of the following PB07-funded materiel programs:

Aviation Modernization

AH-64 Apache
Armed Reconnaissance Helicopter (ARH)
Light Utility Helicopter (LUH)
UH-60 Black Hawk
CH-47 Chinook
Extended Range/Multi-Purpose (ER/MP) Unmanned Aircraft System (UAS)
Small Unmanned Aircraft System (SUAS)
Fixed Wing
Hellfire Family of Missiles
Advanced Precision Kill Weapon System (APKWS)
Aircraft Survivability Equipment (ASE)
Aviation Electronics (Avionics)
Aircrew Integrated Systems (ACIS)
Air Traffic Services/Army Airspace Command and Control (ATS/A2C2)
Aviation Ground Support Equipment (AGSE)
Aircraft Component Improvement Program (ACIP)
Training Aids, Devices, Simulators and Simulations (TADSS)

Soldier Modernization

Soldier as a System (SaaS)
Ground Soldier System (GSS)
Mounted Warrior (MW)
Air Warrior (AW)
Enhanced Night Vision Goggles (ENVG)
Thermal Weapon Sights ((TWS)
XM307 Objective Crew Served Weapon (OCSW)
Lightweight Laser Designator Range Finder (LLDR)
Nonlethal Capabilities Set (NLCS)

Ground Force Modernization

Abrams Tank
Bradley Fighting Vehicle
Stryker Family of Armored Vehicles
Lightweight 155 Howitzer (M777)
M119A2 Lightweight 105-mm Towed Howitzer

Future Combat Systems (FCS) [1]
Non-Line-of-Sight Cannon (NLOS-C) [2]
Non-Line-of-Sight Launch System (NLOS-LS) [2]
High Mobility Artillery Rocket System (HIMARS)
Army Tactical Missile System (ATACMS) Family of Munitions
Chemical Energy Missiles—Javelin and TOW 2B
Improved Target Acquisition System (ITAS)
Guided MLRS (GMLRS) Rocket
120-mm XM395 Precision Guided Mortar Munition (PGMM)
Excalibur
Precision Guidance Kit (PGK)
Mid-Range Munition (MRM)
M117 Armored Security Vehicle (ASV)

Protection capabilities prevent an enemy's effect on us. The protection FCB portfolio includes personnel and infrastructure protection, nonproliferation and counterproliferation, and consequence management. **Appendix 2, Protection**, provides a description and status of the following PB07-funded materiel programs:

Air and Missile Defense (AMD) Modernization

PAC-3/MEADS Combined Aggregate Program (CAP)
Terminal High Altitude Area Defense (THAAD)
Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM)
Ground-Based Midcourse Defense (GMD) Segment
Counter-Rocket, Artillery and Mortar (C-RAM)
Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS)
Rapid Aerostat Initial Deployment (RAID)
Sentinel
Air and Missile Defense Planning and Control System (AMDPCS)
Forward Area Air Defense-Command and Control (FAAD-C2)
Air Defense and Airspace Management (ADAM) Cell
Joint Tactical Ground Station (JTAGS) Multi-Mission Mobile Processor (M3P)

Chemical, Biological, Radiological, Nuclear (CBRN) Defense Modernization

M31/M31A1/M31E2 Biological Integrated Detection System (BIDS)
Stryker-Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)
M56 Wheeled Smoke System (Coyote)
Vehicle Obscuration Smoke Systems (M6 and M7)
Chemical Biological Protection Shelter System (CBPSS)
Joint Portal Shield (JPS) Detector System
Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD)
Joint Chemical Agent Detector (JCAD)

1 Future Combat Systems includes 18+1+1 systems consisting of unattended ground sensors (UGS); two unattended munitions, the Non-Line-of-Sight–Launch System (NLOS-LS) and Intelligent Munitions System (IMS); four classes of unmanned aerial vehicles (UAVs) organic to platoon, company, battalion and BCT echelons; three classes of unmanned ground vehicles, the Armed Robotic Vehicle (ARV), Small Unmanned Ground Vehicle (SUGV), and Multifunctional Utility/Logistics and Equipment Vehicle (MULE); and the eight manned ground vehicles (i.e., Mounted Combat System (MCS), Infantry Carrier Vehicle (ICV), Non-Line-of-Sight Cannon (NLOS-C), Non-Line-of-Sight Mortar (NLOS-M), Reconnaissance and Surveillance Vehicle (RSV), Command and Control Vehicle (C2V), Medical Vehicle (MV), and FCS Recovery and Maintenance Vehicle (FRMV)). (18 individual systems); plus the network (18+1); plus the Soldier (18+1+1). Although some of these systems are funded separately, they are core FCS systems.

2 Although funded separately, this is a core FCS system.

Joint Chemical, Biological, and Radiological Agent Water Monitor (JCBRAWM)
Joint Warning and Reporting Network (JWARN)
Joint Effects Model (JEM)
Joint Portable Decontamination System (JPDS)
Joint Service Sensitive Equipment Decontamination (JSSED) System
Joint Service Transportable Decontamination System (JSTDS)
Joint Service Personnel/Skin Decontamination System (JSPDS)
Joint Platform Interior Decontamination (JPID)
M100 Sorbent Decontamination System (SDS)
Joint Service General Purpose Mask (JSGPM)
Joint Biological Agent Identification and Diagnostic System (JBAIDS)
National Guard Weapons of Mass Destruction Civil Support Team (WMD-CST) Unified Command Suite (UCS)
National Guard Weapons of Mass Destruction Civil Support Team (WMD-CST) Analytical Laboratory Suite (ALS)
CBRNE Installation Protection Program (IPP)

Counter-IED Modernization

Warlock/CREW

Focused logistics (FL) capabilities deploy, sustain and support the force. The FL FCB portfolio includes deployment distribution, sustainment, medical, mobility, and logistics command and control. **Appendix 3, Focused Logistics**, provides a description and status of the following PB07-funded materiel programs:

Unity of Effort Modernization

Global Combat Support System-Army (GCSS-Army)
Battle Command Sustainment Support System (BCS3)
Medical Communications for Combat Casualty Care (MC4) System

Domain-Wide Visibility Modernization

Movement Tracking System (MTS)
Property Book Unit Supply Enhanced (PBUSE)
Standard Army Maintenance System (SAMS-E)

Rapid and Precise Response Modernization

Joint High Speed Vessel (JHSV) (formerly the Theater Support Vessel (TSV))
Joint Precision Airdrop Systems (JPADS)
Advanced Aviation Forward Area Refueling System (AAFARS)
Petroleum Quality Analysis System (PQAS)
Tactical Electric Power (TEP)
Standard Automotive Tool Set (SATS)
Family of Medium Tactical Vehicles (FMTV)
High Mobility Multipurpose Wheeled Vehicle (HMMWV)
Heavy Expanded Mobility Tactical Truck (HEMTT)
Palletized Load System (PLS)
Containerized Kitchen (CK)
Unit Water Pod System (Camel)
Load Handling System (LHS) Compatible Water Tank Rack System (Hippo)
Load Handling System Modular Fuel Farm (LMFF)
1,500-GPH Tactical Water Purification System (TWPS)
Rapidly Installed Fluid Transfer System (RIFTS)
Container/Material Handling Equipment (C/MHE)

Maintenance Support Device (MSD)
Man-Transportable Robotic System (MTRS)
Forward Repair System (FRS)

Assured Mobility Modernization

AN/PSS-14 Handheld Standoff Mine Detection System (HSTAMIDS)
Ground Standoff Minefield Detection System (GSTAMIDS)
Airborne Surveillance, Target Acquisition, and Minefield Detection System (ASTAMIDS)
Route Clearance Vehicles
Intelligent Munitions System (IMS) [2]
Spider (Anti-personnel Land Mine Alternative (APL-A))
Improved Ribbon Bridge (IRB)
Rapidly Emplaced Bridge System (REBS)
Dry Support Bridge (DSB)

Battlespace awareness (BA) capabilities collect, analyze and process battlespace information. The BA FCB portfolio includes all source intelligence collection, environmental data collection, predictive analysis, and knowledge management. **Appendix 4, Battlespace Awareness**, provides a description and status of the following PB07-funded materiel programs:

Distributed Common Ground System-Army (DCGS-A)
All Source Analysis System (ASAS)
Aerial Common Sensor (ACS)
Advanced Field Artillery Tactical Data System (AFATDS)
Long-Range Advanced Scout Surveillance System (LRAS3)
Tactical Exploitation System (TES)
Integrated Meteorological System (IMETS)
Trojan Special Purpose Integrated Remote Intelligence Terminal (Trojan SPIRIT)
Prophet
Tactical Unmanned Aerial Vehicle (TUAV) Shadow 200
Counterintelligence/Human Intelligence Information Management System (CHIMS)
Sequoyah Foreign Language Translation System (S-FLTS)

Command and control (C2) capabilities plan, prepare and direct execution of missions. The C2 FCB portfolio includes common operational picture (COP), joint C2, communications and computer environment, and our own force information collection. **Appendix 5, Command and Control**, provides a description and status of the following PB07-funded materiel programs:

Army Battle Command System (ABCS)
Global Command and Control System-Army (GCCS-A)
Joint Command and Control (JC2) Capabilities
Mounted Battle Command on the Move (MB-COTM)
Maneuver Control System (MCS)
Command Post of the Future (CPOF)
Standardized Integrated Command Post System (SICPS)
Army Airborne Command and Control System (A2C2S)
Space Support Enhancement Toolkit (SSET)
Force XXI Battle Command Brigade and Below (FBCB2)
Grenadier BRAT (GB) and Mini-Transmitter (MTX) Blue Force Tracking (BFT) System
Single Channel Ground and Airborne Radio System (SINCGARS)

Net-centric capabilities help provide universal access to all relevant authorities, assets and capabilities and enable commanders to

2 Although funded separately, this is a core FCS system.

effectively coordinate battlefield effects and maintain full spectrum dominance and decision superiority. The net-centric FCB portfolio consists of integrated information systems and supporting information infrastructure. **Appendix 6, Net-Centric**, provides a description and status of the following PB07-funded materiel programs:

Satellite Communications (SATCOM)
Combat Service Support (CSS) Satellite Communications (SATCOM)
Global Positioning System (GPS)
Warfighter Information Network-Tactical (WIN-T)
Joint Tactical Radio System (JTRS)
Bridge-to-the-Future Network (BFN)
Joint Network Node (JNN)
Joint Network Management Systems (JNMS)
Integrated Systems Control (ISYSCON) (TIMS)

Appendix 1: Force Application

Force application is the sum of all actions taken to cause desired effects on our adversary. Force application encompasses all aspects of fires and maneuvers that suppress, neutralize, seize or destroy an objective. These effects are conducted with precision—in time, sequence, location, duration and intensity—in order to apply immediate and continuous pressure on enemy capabilities. These actions occur in all domains—land, maritime, space and cyberspace—and include conventional and unconventional operations using conventional weapons, nonlethal weapons or nuclear weapons. These actions are enabled by offensive information operations (IO).

The Joint Force—adept at overcoming anti-access and area-denial strategies, attacking throughout the depth and breadth of the battlespace, and defeating fixed and mobile targets in all terrain and weather conditions across the full spectrum of conflict—requires a broad range of force application capabilities. The Army provides significant force application capabilities through sustained land dominance using conventional and unconventional air and ground maneuver forces that gain and maintain a positional advantage with decisive speed and overwhelming operational tempo. This dominant maneuver capability enhances the timeliness, range, precision and impact of joint fires. Enabled by space, airborne and ground-based systems that provide robust command, control, communications, and computer (C4) and intelligence, surveillance and reconnaissance (ISR) and an enhanced suite of kinetic and nonkinetic munitions, the Army provides lethal and precise fires for the Joint Force commander.

In conjunction with the Joint Force, the Army provides full-spectrum forces that are able to integrate maneuver, fires and IO across the full range of military operations. These include conducting operational maneuver from strategic distances; conducting mobile strike operations; closing with and destroying enemy forces; applying precision fires and maneuver; exercising information superiority; commanding and controlling joint and multinational forces; and providing direct, continuous and comprehensive control over terrain, resources and people.

The Army is equipping the Soldier to continue to provide force application capabilities required in the evolving security environment. This appendix provides a brief discussion of the Army's force application capabilities that provide the Joint Force dominant air and ground maneuver coupled with precision engagement and the key materiel programs associated with these capabilities. While materiel programs that support operational maneuver from strategic distances and assure

mobility are force application capabilities supporting dominant maneuver, these programs are described in this annex under Appendix 3, Focused Logistics, given that deployment distribution and mobility are areas within the current FL FCB portfolio.

Aviation Capabilities

Aviation's strength is its ability to deploy quickly, maneuver rapidly, focus tremendous combat power, and achieve surprise and positional advantage. It is instrumental in achieving simultaneous, distributed and continuous combined arms air-ground operations.

With its manned and unmanned assets, aviation organizations develop situations from both in and out of contact with the enemy, maneuver to positions of advantage, engage enemy forces beyond the range of their weapons, destroy them with precision fires, and provide close support. Its inherent mobility, flexibility, agility, lethality and versatility are instrumental in enabling the air-ground task force commander to conduct decisive joint operations.

Aviation conducts maneuver, maneuver support, and maneuver sustainment operations across the spectrum of conflict. Highly skilled and knowledgeable aviation Soldiers employing aviation systems from entry operations to decisive action provide a significant contribution to the quality of firsts (see first, understand first, act first and finish decisively). Aviation operations develop the COP, shield the maneuver force, shape the battlefield, extend the tactical and operational reach of the maneuver commander, and sustain the force. Aviation is critical to the Army's stability and support requirements, to include the homeland security requirements of our nation. Modernization and sustainment of Army aviation ensures these capabilities are maintained.

Aviation Modernization

Aviation modernization and recapitalization of existing aviation systems projected to remain in the fleet into the 2015-25 time frame are essential to supporting current as well as future operations. The urgent need to address the steadily deteriorating condition of the aviation fleet and accelerate reserve component (RC) modernization is being addressed through an aviation transformation plan. This plan:

- Accelerates active component (AC) and RC aviation modernization efforts
- Aligns aviation structure and resources to comply with future force requirements, including Unmanned Aircraft Systems (UAS)
- Accelerates divestiture of nonmodernized aircraft (UH-1, OH-58D and OH-58A/C)
- Restructures and standardizes attack and lift formations across the force
- Leverages new training technologies to maintain crew proficiency
- Invests in improvements for aircraft and UAS reliability/maintainability
- Procures new UH-60Ms to accelerate fielding of utility aircraft to the Army National Guard (ARNG)
- Procures Light Utility Helicopters (LUHs) to divest aging UH-1s and OH-58A/Cs primarily found in the ARNG
- Converts an additional 96 AH-64As located in Army Reserve and ARNG units to AH-64Ds

- Procures Armed Reconnaissance Helicopters (ARHs) to divest the OH-58KWs
- Procures the Future Cargo Aircraft (FCA) to replace an aging fixed-wing fleet
- Procures Extended Range/Multi-Purpose (ER/MP) Unmanned Aircraft Systems (UAS)
- Procures Small Unmanned Aircraft Systems (SUAS)
- Invests in future (2025) joint solutions: Joint Heavy Lift (JHL)
- Continues to upgrade the aviation force with an improved infrared countermeasure suite capable of defeating the most advanced threat man-portable air defense system

The last several years have seen great progress in modernizing Army aviation. Fielding of the AH-64D Longbow Apache is well underway. Recapitalization programs for the CH-47 Chinook and UH-60A Black Hawk continue to provide outstanding products to the ARNG. The ARH will replace the OH-58D. Fixed wing is modernizing its current turboprop fleet (C-12 and RC-12) with the Global Air Traffic Management (GATM) system as well as other safety and cockpit management systems, which will keep these aircraft relevant while the Army procures the FCA to replace legacy C-23 Sherpas and older C-12s. The Army is successfully retiring aging and obsolete aircraft from the force, and lessons learned from previous and current military operations and deployments are being addressed. The Army is continuing to examine the best means to achieve the vertical envelopment capability required to rapidly project the FCS-equipped forces across difficult or distant geographic locations. Future requirements for a robust, fully modernized aviation force are continuing to be developed.

Unmanned Aircraft Systems (UAS)

As the Army transforms to a more flexible, responsive and lethal future combat force, Army UAS will also transform to provide integrated, responsive and lethal capabilities to commanders at all echelons. Future commanders will require UAS with a command and control capability that facilitates the flexible and rapid application of overmatching, decisive land power at specific times and locations throughout a greatly expanded battlespace. On battlefields of the future, UAS will support all Army echelons, across the spectrum of conflict, on varied terrain and across the battlefield operating systems. Redefining the Army's UAS requirements reflects an evolutionary process to ensure the support required for tomorrow's Army while providing the best support possible to our forces engaged in the global war on terrorism.

In Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF), UAS such as the Raven, Shadow 200, Hunter and Improved GNAT (I-GNAT) are providing a new dimension to maneuver forces. The Raven is being provided in theater to OEF and OIF units to enhance small unit reconnaissance, surveillance and target acquisition (RSTA). Raven training for deploying units is conducted in theater and in CONUS. The Shadow 200, the Army's first Tactical Unmanned Aircraft System (TUAS) to go into full-rate production (FRP), is also in use as it continues to be fielded to the military intelligence (MI) company within the Army's maneuver brigades, including the new Stryker brigades. Planned system improvements include engine and airframe upgrades, refined target location error, Tactical Common Data Link (TCDL) and addition of a laser designation into the payload gimble.

The Hunter UAS is fielded within III, V and XVIII Corps aerial exploitation battalions, with

one UAS company per corps consisting of six air vehicles and associated payload and ground control stations. The Hunter is a RSTA and battle damage assessment (BDA) asset providing ground forces with near real-time imagery via electro-optical/infrared (EO/IR) intelligence at ranges up to 200 km. The Hunter UAS, while being used extensively as an ISR platform, has recently been upgraded to employ the Viper Strike munition in OIF. The Hunter UAS capability will be sustained until the ER/MP UAS is fielded at the division level as a RSTA, target attack and command, control, communications and intelligence (C3I) system.

Current UAS modernization efforts focus on accelerating Shadow fielding and providing an SUAS system like the Raven to meet today's operational needs, accelerating future force UAS development and fielding into the current force, continuing development of the ER/MP UAS and science and technology (S&T) efforts that leverage technologies for improved UAS capabilities.

To prepare for the future operational environment, the Army is identifying the latest advances in relevant UAS technology (airframes, payloads, payload management, as well as precision weapons delivery) and integrating these new capabilities into an architecture that is consistent with Army and DOD transformation. Extensive S&T work is also being conducted on vertical takeoff and landing UAS to provide a hover-and-stare capability. The continued development and fielding of UAS with advanced payloads is an important component of the future force's operational concept.

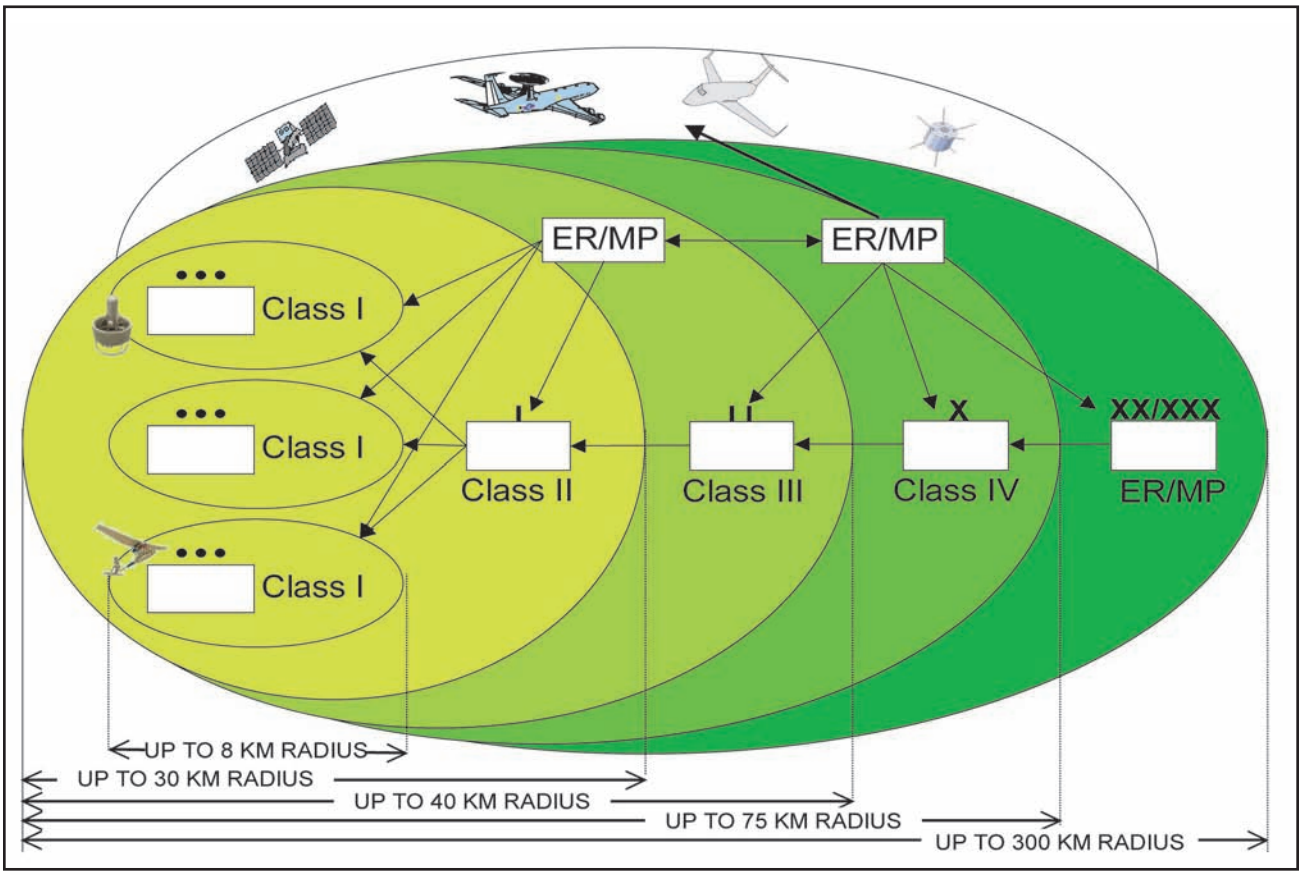


Figure D-4. UAS Future Force Footprint

The future combat force will include an integrated family of UAS that provide support from the platoon-level to the division/corps (Figure D-4). The FCS classes of UAS will be fully integrated elements of the organic ISR capabilities. The FCS Classes I and II UAS are intended to provide the squad leader through the company commander the capability to see over the next terrain feature. The FCS Class III UAS will enable a variety of combat functions such as precision fires, route reconnaissance and situational development at the battalion level. The FCS Class IV UAS will serve as the FCS Brigade Combat Team's (BCT) ISR workhorse to facilitate situational awareness, battle command, targeting support, lethal engagement, BDA and force protection. The Army recently selected the Northrop Grumman Fire Scout for development as the Class IV UAS. While the path to the transformed Army will focus on the evolving future combat force, improving the current force and maintaining interoperability with fielded systems will remain as important and concurrent objectives.

Future Combat Force Aviation

The Army envisions organizing aviation assets into brigade formations at all division and corps levels in support of the ground maneuver brigades and BCTs. Teaming UAS with manned systems will enhance operational fires, maneuver and intelligence collection capabilities for the commander. Future force aviation modernization efforts incorporate lessons learned, the changing operational environment and emerging Joint Force requirements. These efforts leverage key technologies in areas such as electronics, communications and automation open systems architectures, UAS interoperability, propulsion systems and weaponization. These efforts include:

- Fielding SUAS, ER/MP and FCS Classes I through IV UAS
- Ensuring digital interoperability for effective joint/combined force operations
- Fielding effective, affordable systems that enhance aviation survivability and improve Soldier stamina
- Improving aircraft operational readiness by leveraging technology to reduce costs and extend aircraft service life; strategy includes pursuit condition-based maintenance plus (CBM+) initiatives such as the aircraft component improvement program, digital source collection and health usage monitoring
- Replacing obsolete air traffic services equipment and maintaining compliance with future airspace usage requirements
- Digitizing of aviation logistics and modernizing aviation ground support equipment and improving training
- Developing the technologies to ensure fielding of unmanned systems, interoperability of manned/unmanned aircraft, and next generation/future system development
- Leveraging technology to reduce costs, extend aircraft service life and improve training
- Replacing OH-58D aircraft with the ARH to correct numerous capability gaps (interoperability, survivability, agility, versatility, lethality and sustainability)
- Procuring new UH-60M/HH-60M aircraft to grow fleet size to meet modular force requirements; refresh the Black Hawk fleet by reducing the average age of the fleet while providing improved technology that

increases reliability, maintainability and sustainability

- Replacing three aging fixed-wing aircraft (C-12, C-23 and C-26) with the FCA
- Continual modernization of the AH-64D to a Block III configuration with greater capabilities and increased reliability
- Replacing aging UH-1 and OH-58 aircraft with a commercial off-the-shelf (COTS) LUH

The Army aviation modernization plan transforms aviation units to meet the Chief of Staff, Army (CSA) vision for aviation as a modular, capabilities-based maneuver arm organized for the joint fight with a reduced logistics tail. The AC/RC aviation organizations will be structured to meet the Strategic Planning Guidance by providing capabilities-based formations.

Discussion of Key Aviation Materiel Programs

AH-64 Apache

Description. The AH-64 Apache is the Army's heavy attack helicopter for the current and evolving future combat forces. It is assigned to attack battalions and regimental aviation squadrons in both the AC and RC. Apache is a two-pilot, twin-engine attack helicopter designed to meet the current mission requirements for reconnaissance and attack worldwide, day or night, and under obscured battlefield and/or adverse weather conditions. It is a highly mobile and lethal aerial weapons platform with an array of armaments designed to destroy armor, personnel and materiel. The Apache has been in the Army inventory since 1986, and an upgraded AH-64D Longbow began fielding in 1998. The AH-64D upgrades, among other improvements, adds a millimeter wave Fire Control Radar (FCR), Radar Frequency Interferometer (RFI), fire-and-forget radar-guided missile, and cockpit management and digitization enhancements. The combination of the FCR, RFI and the advanced navigation and avionics suite provides increased situational awareness, lethality and survivability. The Apache-focused recapitalization program integrates a number of related initiatives to produce and/or retrofit aircraft across the Apache fleet to meet the objectives of the Army's recapitalization policy and to address lessons learned from recent combat operations and deployments. This program increases aircraft life by addressing high-maintenance demand/operating and support (O&S) cost drivers and incorporating a second-generation forward-looking infrared (FLIR) with the Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor (M-TADS/PNVS). The program goals are to reduce the overall average airframe age of the fleet to the half-life metric of 10 years by 2010, increase the unscheduled mean time between removal rate by 20 percent for selected recapitalized components, and maximize the return on recapped components by 20 percent.

Program Status. The remanufacture of 597 AH-64As to the AH-64D Longbow configuration will be complete in FY10. Multi-year I delivered 232 AH-64Ds through FY02. A second multi-year contract was signed in Oct 00

for an additional 269 AH-64Ds with deliveries through FY06. In Sep 05, a contract was signed providing 13 wartime replacement aircraft in the lot 10 configuration. Deliveries of these aircraft begin in the summer 2007. An additional 96 AH-64A model Apache conversions to the D model Longbow configuration will occur with inductions beginning in Jan 07 and deliveries in FY08 through FY10. Following this conversion, the Apache modernization plan continues in 3QFY10 with the initiation of the Block III Apache Longbow program. The Block III Longbow will provide a net-ready capability that integrates the Apache into the future force as well as provides platform weight reduction, open systems architecture and reduced pilot workload via cognitive decision aiding technologies. A Milestone B Defense Acquisition Board is scheduled for spring 2006 to receive Office of the Secretary of Defense (OSD) approval to proceed into the system development and demonstration (SDD) phase. Fielding of the M-TADS to the total fleet began with first unit equipped (FUE) in FY05 and will be completed by the end of FY11.

Armed Reconnaissance Helicopter (ARH)

Description. As a result of analysis identifying existing capability gaps and subsequent CSA Aviation Focus Group decisions, in Feb 04 the CSA identified the need for 368 ARH aircraft. The ARH program was established to correct deficiencies in the OH-58D currently fulfilling the reconnaissance role. The mission of the ARH is to provide a robust reconnaissance and security capability for the joint combined arms air-ground maneuver team. The ARH will be fielded to support the current force in the global war on terrorism and will possess the growth potential to bridge the capabilities gaps to the evolving future combat force.

Program Status. On 29 Jul 05, Bell Helicopter Textron, Inc., Fort Worth, Texas, was awarded a cost-plus-incentive-fee contract for the SDD of the ARH, including subsystem integration and testing as well as training-device development. Work will be performed in Fort Worth and is estimated to be completed on 30 Sep 08. The SDD planned efforts include integration of nondevelopmental item (NDI) subsystems onto an existing helicopter platform, developmental/operational testing and qualification to support the Milestone C low-rate initial production (LRIP) decision. An FRP decision review will be held in FY09.

Light Utility Helicopter (LUH)

Description. The LUH will conduct light utility missions in support of specified Army tasks. The specified Army tasks will be conducted as part of an integrated effort with other Services, government agencies, nongovernmental organizations and civil organizations. These missions include homeland security support operations, general support operations, generating force medical evacuation (MEDEVAC) operations, and support for Army training centers and test activities.

The LUH will replace the UH-1 and OH-58A/C aircraft. Additionally, introduction of this aircraft will return a number of UH-60s back to the warfighting force. The LUH will be a commercial/NDI aircraft that is less costly to procure and operate than the UH-60. It is being procured as a Federal Aviation Administration (FAA)-certified aircraft. The maintenance concept will employ a mix of Soldier and contractor logistics support; the initial operator and maintainer training will be provided by the contractor.

Program Status. The initial capabilities document (ICD) was JROC-approved in Dec 04, and the Capability Development

Document (CDD) was JROC-approved in Jun 05. The Acquisition Strategy Report was approved in Jul 05, and OSD has delegated the program to the Army as an acquisition category (ACAT)-IC. The LUH program is now undergoing source selection activities and is scheduled for Milestone C/LRIP decision in May 06 with FUE in FY07.

UH-60 Black Hawk

Description. The UH-60 Black Hawk is the Army's current force and future force utility and MEDEVAC helicopter. The UH-60 fleet is composed of 1,596 aircraft. There are 959 UH-60A models, which began production in 1977; 609 UH-60L models, which began production in 1989; and 28 configurations and mission equipment package variants of the UH-60A/L supporting the Army today. The Black Hawk can transport 11 fully equipped combat troops plus an external load up to 8,000 pounds for the UH-60A and 9,000 pounds for the UH-60L. The UH-60 provides the force commander with a rapid and agile maneuver capability through air assault, general support, airborne command and control, and MEDEVAC. The UH-60 gives commanders the ability to initiate, conduct and sustain combat operations by providing internal and/or external lift of troops, weapon systems, supplies and equipment. In the airborne command and control role, it provides full joint and combined interoperability with other command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) elements to commanders at all echelons. The UH-60 is also utilized in support of homeland security and natural disaster relief operations, such as fire suppression, personnel recovery and key personnel transport. The UH-60 is vital to the homeland security needs of our nation.

The Army will procure new UH-60M/HH-60M (MEDEVAC variant) to extend the fleet's lift and range capabilities, reduce O&S costs, enhance survivability, improve strategic transportability, integrate Air Warrior, digitize avionics and flight management systems, plus incorporate GATM requirements, and extend aircraft life. The UH-60M and HH-60M are expected to meet utility and MEDEVAC mission requirements through 2025.

Program Status. The UH-60M and HH-60M programs have received Milestone C LRIP approval and expect FRP decision in May 07. The Army will procure the first 22 LRIP aircraft in FY06. The FUE for the UH-60M is in FY08. The accelerated development of new technologies has resulted in an upgrade program for the UH-60M that will include fly-by-wire Common Avionics Architecture System and Full-Authority Digital Engine Control. The Milestone C LRIP decision for these upgrades will be in FY08.

CH-47 Chinook

Description. The CH-47 Chinook is a twin-turbine, tandem-rotor, heavy-lift transport helicopter with a useful load of up to 25,000 pounds. As the Army's only heavy-lift helicopter, the mission of the CH-47 is to transport troops (including air assault), supplies, weapons and other cargo in combat, combat support, and combat service support operations. The CH-47 is vital to the war on terrorism and homeland security needs of our

nation. Secondary missions include medical evacuation, aircraft recovery, parachute drops, disaster relief, and search and rescue. These aircraft are fielded to heavy helicopter companies and special operations aviation. The CH-47F recapitalization program will provide a more reliable, less costly to operate aircraft compatible with joint digital connectivity requirements in the future force with an extended life of approximately 20 years. Key modifications integrate a new-machined airframe, an upgraded T55-GA-714A engine to restore performance capability, Common Avionics Architecture System, Air Warrior, Common Missile Warning System, enhanced air transportability, Digital Automatic Flight Control System (DAFCS), and an Extended Range Fuel System II for self-deployment

missions. The CH-47F is expected to remain the Army's heavy-lift helicopter until at least the 2020-2025 time frame. The CH-47F also incorporates reliability and maintainability improvements including airframe tuning for vibration reduction, corrosion protection, digital source collectors, and an automated maintenance program with a 400-hour phase interval. The total CH-47 program remanufactures CH-47Ds and special operations aviation MH-47s to the CH-47F/MH-47G configuration and procures the Army aviation transformation full requirement for Chinook aircraft.

Program Status. The CH-47F program received FRP approval on 22 Nov 04, and is currently on contract for 27 CH-47F aircraft, with first delivery scheduled for Sep 06. Initial fielding is to the 160th SOAR (MH-47G) and the 101st AA Division (CH-47F).

Extended Range/Multi-Purpose (ER/MP) Unmanned Aircraft System (UAS)

Description. The ER/MP UAS will provide dedicated mission configured UAS support to the division/corps commander that supports tactical maneuver, with a large requirement for support to the battlefield surveillance brigade (BFSB) and fires brigade; helps maximize combat power; and facilitates operations in an unpredictable and changing environment allowing commanders to act first and finish decisively by providing answers to the commander's critical information requirements. This is accomplished through its long-range, persistent-stare, wide-area surveillance, and wide-area communications networking capabilities. The ER/MP UAS provides tactical commanders a real-time responsive capability to conduct an array of missions to include reconnaissance, surveillance and target acquisition, command and control, communications relay, signals intelligence, electronic warfare, attack, weapons of mass destruction detection and battle damage assessment capability.

The ER/MP is more than an airplane; it is a system that takes into account the entire DOTMLPF solution—people, training, integration with the tactical units and command environment, and ability to conduct 24/7 continuous operations against moving and stationary targets as defined in the Operational Requirements Document (ORD). The ER/MP system is comprised of 12 multi-role air vehicles (six with SATCOM), five ground control stations, two portable ground control

stations, five Tactical Common Data Link (TCDL) ground data terminals, two TCDL portable ground data terminals, one SATCOM system, four automatic takeoff and landing systems, 12 electro-optic/infrared, and 12 synthetic aperture radars/moving target indicators. The ER/MP system equates to a company-size organization and is planned to be fielded as a separate company organic to the combat aviation brigade. Ten companies are planned.

Program Status. The ER/MP received Milestone B approval in Apr 05. Source selection and awarding of the SDD contract was completed in Aug 05. FUE for ER/MP is planned for FY09 with IOC planned for FY10.

Small Unmanned Aircraft System (SUAS)

Description. The SUAS is a lightweight, hand-launched air vehicle that gives brigade to company commanders a far greater ability to shape over-the-hill operations with their own dedicated unmanned aerial vehicles. The SUAS system is designed to operate throughout the full spectrum of offensive and defensive combat operations.

The SUAS is rucksack portable and consists of five basic components: ground control station (GCS), remote video terminal (RVT), air vehicle (AV) (three AVs per system), payload and field repair kit (FRP).

The GCS is a small, lightweight device that allows the operator to program and command the AV via semi-autonomous navigation (via waypoints) and tele-operation (direct operator controlled) navigation. Also, it enables the operator to program mission flight parameters to include coordinates for the launch point, en route/objective waypoints, primary recovery point and contingency recovery points. With a wingspan of 4.5 feet and a weight of 4.2 pounds, the hand-launched, battery-powered AV provides aerial observation, day or night, at line-of-sight (LOS) ranges up to 10 km and delivers color or infrared imagery in real time to the GCS and RVT. Flight duration of 90 minutes is possible with organic rechargeable lithium batteries. Assembly, preflight and launch is accomplished in less than five minutes, with little skill required of the operator. Hand launch and auto-land recovery is made in a small area without a prepared site or auxiliary equipment. Both one-man and two-man operations are possible.

Program Status. LRIP contract was awarded on 13 Oct 05 for 10 SUASs. Deliveries are planned to start in Nov 05 and fielding to units for initial operational test and evaluation (IOT&E) training is scheduled during 3QFY06. Following FRP decision, SUAS is planned to be fielded in Jul 06.

Fixed-Wing

Description. The Army fixed-wing program is composed of approximately 300 aircraft. Fixed-wing aircraft provide efficient, effective transportation during peacetime and wartime operations. Fixed-wing aircraft provide for rapid movement of personnel, critical mission equipment/supplies and special electronic mission aircraft (SEMA) intelligence support. SEMAs collect, analyze and disseminate signal communications and imagery and electronic intelligence in support of wartime requirements for Combatant Commanders, field commanders and national intelligence assets. Fixed-wing aircraft are routinely utilized in disaster relief operations, for air movement of personnel and critical supplies, civil support, counterdrug, security assistance and homeland security missions. The Army modernization plan calls for the FCA to begin replacing older C-23, C-12 and C-26 aircraft starting in FY08.

FCA provides the Army with a self-deployable, 2,400-km cargo aircraft with an 18,000-pound payload capable of performing short takeoffs and landings. FCA will be the predominant Army fixed-wing aircraft with 128 airframes mostly assigned to the RC. The Army is expected to procure 33 FCA (FY06-11) to rapidly move personnel and critical supplies across the battlefield.

Program Status. In Jan 05 the JROC approved the FCA ICD, and in Sep 05 the JROC approved the FCA CDD. These documents pave the way for the modernization of the current Army fixed-wing fleet that will better meet the requirements of the future force.

Hellfire Family of Missiles

Description. Hellfire (HF) air-to-ground missiles are employed to destroy armored and high-value point targets. Semi-active laser (SAL) HF tracks laser energy delivered by ground or airborne designators while Longbow HF uses internal millimeter wave radar frequency (RF) for autonomous guidance. AH-64 Apache, ARH, ER/MP and OH-58D Kiowa Warrior utilize HF as their primary air-to-ground weapon for destruction of high-value point targets. The complementary precision-point, target-engagement capability of the SAL HF and the fire-and-forget, adverse-weather capability of the RF HF provide the commander with flexibility across a wide range of mission scenarios, permitting fast and decisive battlefield response.

Program Status. The Army will address additional Hellfire procurement in the FY08-13 program plan.

Advanced Precision Kill Weapon System (APKWS)

Description. APKWS incorporates laser guidance into the 2.75-in Hydra-70 rocket to provide a lower-cost, lighter-weight precision weapon capable of engaging nonarmored to lightly armored targets and providing an alternative to HF against targets such as buildings, command posts, air defense artillery (ADA) sites and other targets not requiring the HF. The APKWS program provides accuracy and lethality improvements to the family of unguided rockets. The AH-64, OH-58D and ARH will use APKWS to significantly improve aircraft stowed kill capability in scenarios requiring area/suppressive fires or precision engagement against non-armored or lightly armored targets.

Program Status. APKWS has not yet begun production.

Discussion of Aviation Supporting Materiel Programs

Aviation's supporting programs are essential to the support, sustainment and modernization/recapitalization of the aircraft programs discussed previously. These programs are essential to sustain and protect crews/aircraft, maintain interoperability with supported organizations, and field future force capabilities.

Aircraft Survivability Equipment (ASE). The Suite of Integrated Infrared Countermeasures (SIIRCM) will provide an enhanced infrared countermeasure capability to aviation platforms. A component of the SIIRCM is an advanced Common Missile Warning System (CMWS) with an Improved Countermeasure Munitions Dispenser (ICMD) system with advanced flare munitions. The CMWS/ICMD has been tested and certified and is currently being installed on all aircraft platforms desig-

nated to deploy. Additionally, developmental efforts continue and will culminate with the acquisition of a multi-band, solid-state laser jam head capable of defeating all known infrared threats. The laser jam head is the last component necessary to comprise a full-up SIIRCM. All aircraft scheduled for deployment or undergoing recapitalization will have the required supporting wiring and hardware installed for the SIIRCM devices when appropriate. The Army's RF-guided missile protection program will employ the same acquisition strategy as the infrared program. The Army is also planning to upgrade laser warning devices (AN/AVR-2 series) across the fleet.

Aviation Electronics (Avionics). Avionics programs are designed to ensure aviation platforms meet combined arms and joint requirements for C2, mission planning, communications, navigation (to include worldwide civil airspace), information interchange and interoperability. Major avionics initiatives include the future fielding of the Joint Tactical Radio System (JTRS) in modernized aviation platforms, which will provide enhanced situational awareness, high-speed data and video exchange, and improvements in interoperability. Delays in JTRS have necessitated the procurement of an interim radio suite providing significant increases in capabilities to include data exchange and SATCOM. Other advancements in avionics include migration of the Aviation Mission Planning Systems (AMPS) to a Joint Mission Planning System (JMPS), which will provide significant increases in mission-planning capabilities including an enhanced mission-rehearsal capability; upgrades to the Improved Data Modem (IDM) as the centerpiece to digitization; Global Positioning System (GPS) equipment for improved navigation accuracy; and GATM equipment mandated when flying in civil airspace; and development of the Joint Precision Approach and Landing Systems (JPALS), which provides a joint common instrument approach system for fixed base, tactical field sites and shipboard procedures.

Aircrew Integrated Systems (ACIS). The ACIS program develops and fields equipment required to protect, sustain and enhance aircrew performance in sustained operations, on the ground, and during survival-evasion operations. Air Warrior is the primary ACIS program that provides integrated, modular life support equipment and chemical/biological protection, reduced weight/bulk, and significantly improved flight time in Mission-oriented Protective Posture (MOPP) 4 gear. Air Warrior is described under Discussion of Key Soldier Modernization Programs in this appendix.

Air Traffic Services/Army Airspace Command and Control (ATS/A2C2). ATS organizations must be specially equipped, highly trained, rapidly deployable, and capable of operating within the United States, and international and combat airspace systems. They provide the full range of air traffic services supporting disaster relief, peacekeeping forces, homeland security and military operations from contingency operations through major combat operations. ATS remains the Army's core enabler for airspace command and control, ensuring synchronized access of the increasingly congested joint, coalition and civil airspace systems. ATS modernization fields smaller, lighter, more efficient, more robust, digitally connected terminal and en route communications, tracking and precision navigation systems for tactical and fixed-base operations. Major programs include the Tactical Airspace Integration System (TAIS), the Air Traffic Navigation, Integration, and Coordination System (ATNAVICS), Mobile Tower System (MOTS), and the Joint Precision Approach and Landing System (JPALS).

Aviation Ground Support Equipment (AGSE). To support and sustain full-spectrum operations, aviation logistics and maintenance must be as responsive and capable as the force it supports. To improve responsiveness, reduce vulnerability and increase operational momentum, aviation must reduce the current in-theater aviation logistics footprint. The goal of AGSE modernization is to reduce logistical support requirements by pursuing common ground support equipment that is mission configurable, enabling redundancy capabilities while improving aircraft operational readiness. Initiatives focus on improved automation, modularity, sustainability and integration of seamless logistics management through automation systems; and replacement of aging ground support equipment.

Aircraft Component Improvement Program (ACIP). ACIP sustains engineering efforts to investigate, identify corrective actions and address field-identified, safety critical and reliability deficiencies. ACIP inserts emerging technology, extends service life, drives down O&S costs and improves readiness by keeping components operationally ready longer.

Training Aids, Devices, Simulators and Simulations (TADSS). TADSS modernization is critical to the combat effectiveness of our aircrews and maintainers, and in reducing operational costs. Aviation TADSS will leverage technology to provide effective and affordable combined arms/joint training and mission planning and rehearsal simulators that are current with the aircraft/systems they replicate. Simulator concurrency, fidelity and combined arms tactical and mission rehearsal simulators/simulations that network virtual, constructive and live simulation systems are major initiatives.

Army Aviation Summary

Army aviation's modernization efforts are focused on fixing warfighting deficiencies (particularly those uncovered during recent operations), aligning the aviation force with the Army's future force concept, and fielding aircraft/subsystems required to achieve full-spectrum operational capability. Aviation modernization is being achieved through force structure changes, training initiatives, and materiel modernization (AH-64D, UH-60M/HH-60M, ARH, LUH, FCA, Apache Block III, CH-47F, UAS, Air Warrior and other subsystem programs). Aviation is supported by S&T programs designed to provide the technology base required to upgrade existing aircraft and meet the challenges of new aircraft/weapon system developments such as the Joint Heavy Lift initiative. This balanced S&T investment for the current force and future force will enable near-term evolutionary technology insertion into the current fleet, while providing the opportunity for revolutionary technology solutions for the future. The Army's commitment to divesting currently obsolete aircraft and ensuring balanced modernization across both AC and RC is being realized. The Army continues to review near-term aviation funding issues to best align programs, create more executable strategies and identify acceptable risks that allow tailoring of program requirements.

Ground Force Capabilities

Army ground maneuver forces with the capability to obtain a positional advantage and bring overwhelming combat power on the enemy with joint fires are essential to joint warfighting. Committed ground maneuver forces can rob an adversary of initiative and remove their freedom to continue hostilities. Sea, air and space dominance are invaluable,

but only land dominance brings hostilities to a decisive conclusion—establishing and maintaining favorable security conditions for more comprehensive and enduring solutions to complex crises.

Our enemies seek sanctuary by hiding in protected facilities (mosques, churches and hospitals) to make it difficult for the commander who must discriminate among combatants and noncombatants. They create dug-in, camouflaged, concealed, hardened positions in caves or deep bunkers and mask these positions around innocent populations to avoid detection and attack by fires. With battlespace understanding and precision fires, Soldiers on the ground are often the only precise instrument that can locate, track and identify conflicted targets and attack them with lethal, accurate and timely effects using sensors linked to weapon delivery systems, Soldiers and decision makers.

The ground force's dominant maneuver and organic high-volume precision fires coupled with other joint precision fire capabilities for the close fight, will overwhelm the adversary, compelling him to flee his sanctuary or face battle to avoid defeat in detail. In either case, enemy dislocation, disintegration and destruction are inevitable through the combination of maneuver and fires enabled by ground force organic and joint ISR, and precision engagement capabilities.

Employing land force provides additional magnitudes of precision, perhaps impossible by other means, and is particularly effective in demonstrating national resolve. At ranges of just inches to strategic distances, the Soldier functions in the role of a sensor, decision maker, shooter and assessor. To assist the Soldier in these roles, the Army is fielding Tacticomp systems to quick reaction forces, combat patrols and tactical human intelligence (HUMINT) teams in Iraq. The Tacticomp is a handheld device that provides Blue Force Tracking (BFT); video, Voice over Internet Protocol (VoIP) and tactical reporting capabilities via wireless networks. Tacticomps have pick lists for ease of use, a "panic button" to send an emergency alert message and local and remote destroy (zeroize) capability. Tacticomps allow the Soldier to send reports directly into the Joint Intelligence Operations Capability–Iraq (JIOC-I) providing actionable intelligence directly to corps and its subordinates. This will enable quicker response times to tactical intelligence and a greater ability to track trends and identify potential threats.

The individual Soldier is the ultimate sensor. A Soldier observes, listens, feels and processes information. He analyzes, judges, thinks, prioritizes, decides and communicates what he knows and does so in real time. The Soldier is a shooter who designates, directs or calls for precision engagement. He does this from inches to the limit of his technology-enhanced LOS, in all weather conditions and terrain sets. Most importantly, he is disciplined and trained, understands purpose and intent, and can assess, first hand, the battle damage and the effects of precision engagement. In effect, the Soldier on the ground is the ultimate precision weapon.

On the asymmetrical, chaotic and nonlinear battlefield, the Soldier on the ground operates, and will continue to operate, as an indispensable part of the joint team. Today, operations in Afghanistan and Iraq reaffirm the Soldier's role as the centerpiece of our combat systems and formations. Soldiers enable persistent surveillance, reconnaissance and the right combination of maneuver, fires and information operations to achieve precision engagement. Soldiers bring the essential human dimension to warfighting dominance.

They are the centerpiece of our systems and formations, now and in the future.

With the Soldier as our critical link to success, it is imperative to continuously develop Soldier systems that will enhance the Soldier's combat effectiveness. The Army's Soldier modernization program is a critical component to transforming today's Soldier into the Soldier envisioned in the future combat force.

Soldier Modernization

The Army is transforming the way it equips Soldiers. This transformation builds upon the CSA's direction in Oct 03 to "equip all Soldiers with the best possible equipment, and do it before they deploy," and his subsequent emphasis in Dec 03 that every Soldier is a rifleman. In a world in which the Soldier is America's most deployed weapon system, the Army continues to take steps to ensure that, where the individual Soldier has the will, the Army will provide the way.

Individual Soldier and small-team modernization is accomplished through a number of mechanisms. In cooperation with its Army partners, Program Executive Office (PEO) Soldier develops and fields individual clothing and equipment, Soldier sensors and lasers, Soldier small arms and integrated Soldier systems. Each of these product lines is reliant on a healthy Army research and development investment strategy to ensure that the Soldier continues to enjoy combat overmatch in the battlespace of today and tomorrow. Shaping the Soldier of tomorrow is the Army's Soldier as a System (SaaS) concept through which the Army is working to take a more holistic approach to equipping Soldiers by providing integrated, modular systems to the individual warfighter. This vision requires a more integrated and synchronized Soldier system requirements management structure to oversee Soldier systems life-cycle management responsibilities across the Department of Army's capabilities needs, acquisition management and resource allocation processes.

At the tactical level, supporting Soldier processes include the Soldier Enhancement Program, Rapid Fielding Initiative, and Rapid Equipping Force. Headquarters, Department of the Army (HQDA) also effects delivery of Soldier capabilities through its management of the Army clothing bag, retained issue, and central funding and fielding processes.

Soldier Enhancement Program (SEP). SEP is an ongoing (since 1989), congressionally sponsored program that uses its funding resources to improve, develop, miniaturize, test or evaluate items of equipment for military qualification using existing or COTS NDI or offshore sources. If no available sources of improved equipment exists, the SEP Integrated Process Team initiates appropriate development efforts, three years or less, utilizing the most advanced and affordable technology. These developments or evaluations are to modernize, integrate and enhance a Soldier's situational awareness, lethality, survivability, mobility, command and control, and sustainability through accelerated acquisition of lighter, more lethal weapons and improved individual Soldier items, including lighter, more comfortable load-bearing equipment, field gear, survivability items, communications equipment and navigational aids.

Rapid Fielding Initiative (RFI). In an effort to accelerate Soldier system fielding to operational forces, the Army is utilizing the RFI that leverages COTS technology and current SEP/clothing and individual equipment programs. RFI focuses on enhancing several areas of Soldier equipment: lethality (includes enhanced optics, weapon rails, target locators and communications); force

AREA	WHERE WE WERE SEPTEMBER 2003	WHERE WE WERE JANUARY 2005	WHERE WE WERE JANUARY 2006
Body Armor	Estimated 10 percent of Soldiers in Iraq equipped	All Soldiers and DOD civilians in theater equipped; plus 60,000 Deltoid Axillary Protectors issued	All Soldiers and DOD civilians in theater equipped; total of 693,000 Body Armor sets fielded; plus 173,000 Deltoid Axillary Protector sets issued
Up-Armored HMMWV	500 Up-Armored HMMWVs in Iraq and Afghanistan	More than 6,400 Up-Armored HMMWVs in Iraq and Afghanistan	More than 11,100 Up-Armored HMMWVs in Iraq and Afghanistan
Tactical Wheeled Vehicle Add-on-Armor Kit	Contingency mission only	More than 19,000 vehicles in theater have Add-on-Armor kits	More than 37,500 vehicles in theater have Add-on-Armor kits
Armored Security Vehicle (ASV)	No ASVs in theater	Resurrected a terminated program; 82 ASVs in theater	194 ASVs in theater
Bradley Reactive Armor Tile (BRAT)	140 sets delivered; acceleration plan in execution	592 sets delivered	790 sets delivered; acceleration plan in execution
Counter-IED Device	Minimal capability in theater	1,496 systems in theater	More than 23,000 systems in theater
Tactical and Small Unmanned Aircraft Systems	Two systems deployed to theater	128 systems in theater	155 systems in theater
Aircraft Survivability Equipment (ASE)	No fixed-wing ASE; in process of upgrading Black hawk and Chinook aircraft with basic ASE	All theater aircraft upgraded with basic ASE	All theater rotary-wing aircraft to be upgraded with latest Common Missile Warning System
Buffalo	No systems deployed in theater	No systems deployed in theater	44 systems deployed

Figure D-5. Protecting Army Forces

protection/mobility (includes advanced combat helmet, knee and elbow pads, military operations in urban terrain (MOUT) kit); and Soldier mission essential equipment (includes enhanced clothing items, hydration system and modular sleeping system). The RFI was an unprogrammed requirement in FY04 funded with supplemental dollars. In FY06, the RFI funding strategy is to also use supplemental funds to support procurement of RFI-designated items. The RFI campaign plan will field RFI to the operational Army by the end of FY07.

Rapid Equipping Force (REF). REF is an operational activity that provides combat commanders with rapid, cutting-edge solutions that increase lethality, improve force protection and enhance survivability. The REF takes operational guidance from the Army G-3, reports to the Vice Chief of Staff Army (VCSA), and works directly with operational commanders to find solutions to identified equipping requirements. These solutions may result in procurement of new or existing military/commercial materiel equipment, or accelerated development of a future force materiel solution for insertion into the current force now. REF accomplishes its mission by working in partnership with industry, academia, Army senior leaders, the Army Training and Doctrine Command (TRADOC), the Army acquisition community, and the Army Test and Evaluation Command (ATEC) to meet immediate warfighter needs. The REF provides direct support to the Joint Improvised Explosive Device (IED) Defeat Organization and the Asymmetric Warfare Group. REF researches, develops and equips forces in theater with counter-IED material solutions. The REF provides general support to the Army to provide immediate warfighter needs in support of the global war on terrorism. REF solutions include robots like the Packbot and

Marcbot for interrogating caves and suspicious packages for booby traps and IEDs; personnel and vehicle scanning systems; persistent surveillance systems; digital translators for Soldiers to communicate with locals in their own language; explosive material detectors; and much more. REF technologies save Soldiers' lives. REF adaptive practices are at the forefront of Army modernization and serve as a catalyst and change agent for Army transformation.

Discussion of Key Soldier Modernization Programs

Soldier as a System (SaaS)

In Nov 04, the VCSA directed the HQDA staff to establish a management structure to implement the SaaS concept. Over the past year, the Army Staff has led the effort to develop and implement a SaaS management approach that institutionalizes the SaaS concept across the major DOD capabilities needs, acquisition management and resource allocation processes.

The SaaS concept began when the TRADOC submitted a SaaS Mission Need Statement (MNS) to the Department of the Army in Aug 02. This MNS served three purposes. First, it established a formal Army process to address and integrate all Soldier capabilities and needs; second, it identified the need to establish a Soldier modernization strategy that would manage the SaaS; and third, it identified capabilities required of all Soldiers to perform individual and collective tasks. The Army Requirements Oversight Committee (AROC) approved the SaaS MNS in Oct 02. TRADOC subsequently chartered the SaaS Integrated Concept Team (ICT) and assigned proponent lead to the Commanding General, United States Army Infantry Center.

Beginning in May 03, the Chairman of the Joint Chiefs of Staff implemented the JCIDS as the successor to the old Requirements Generation System. One outcome of this decision was the creation of a transition period for capabilities needs documentation in response to a joint concepts-centric, capabilities identification process.

During the transition period initiated with the expiration of the SaaS MNS in Oct 04, the Joint and Army Staffs acknowledged the work and time invested by the SaaS ICT in the development of the MNS and ongoing development of the four complementary integrated Soldier Systems CDDs—core, ground, air, and mounted—and any associated by exception stand-alone Soldier programs. The Joint and Army Staffs agreed to a direct conversion of the SaaS MNS to an ICD. The JROC approval of the SaaS ICD in Oct 05, revalidates the Army's need to recognize the Soldier as a System, and to establish integrated baseline capabilities from which to derive Soldier modernization efforts. Further, it prescribes a methodology to enhance the capability of all Soldiers to perform common core tasks, functions and missions.

Identification and validation of Soldier capability gaps is an ongoing process. Analysis of the lessons learned in recent conflicts (Grenada, Just Cause, Desert Shield and Desert Storm, Iraq and Afghanistan) continues to

identify capability gaps in Soldier lethality, survivability, mobility, sustainability, battle command and situational awareness. Task Force (TF) Soldier, initiated by the CSA in Sep 03, identified 40 critical Warrior tasks and nine battle drills driving the Soldiers capability to shoot, move, communicate, and fight. A Soldier Army Capability Review (ACR) conducted in Feb 04 and a Soldier Budget Operating System (BOS) review conducted in Dec 04 validated these capability gaps. A Nov 04 Army System Acquisition Review Council (ASARC) provided the first Army systems of systems level prioritization of Soldier capability gaps confirmed by OEF/OIF experienced small-unit leaders. The Land Warrior Analysis of Alternatives (AOA) completed in Feb 05 further identified core and ground Soldier capability needs.

SaaS formalizes the need to adjust the methodology by which the Army addresses DOTMLPF issues concerning Soldiers. It documents the need for a chartered organization and process to optimize Soldier effectiveness by fully integrating the Soldier with his equipment. Such a management framework will provide for the development and enforcement of SaaS operational concepts and the capability development process. SaaS addresses equipping the Soldier as an integrated fighting system just as any combat vehicle or aircraft.

SaaS further improves Soldier capabilities by optimizing efforts across the DOTMLPF domains and addressing the need to improve Soldier-machine interfaces to enhance the performance of present and future combat platforms. SaaS utilizes a DOTMLPF capability development assessment of lethality, survivability, mobility, sustainability, and battle command and situational awareness in terms of performance, power, weight, volume, cost, training and criticality of need (the metrics to provide Soldiers with solutions that meet their needs within the boundaries and norms of common human performance and that provide a fully integrated SaaS approach to increase the capabilities of all Soldiers to perform individual and collective tasks).

SaaS provides an integrated strategic plan for Soldier modernization and places the Soldier on the future force modernization path. SaaS will enable Soldier modernization to maintain pace with capstone concepts and other programs using a holistic approach to equipping the Soldier. Treating the Soldier holistically will allow Soldier requirements to compete equally with other major programs for funding and resources. SaaS will increase force capability and effectiveness by optimizing Soldier and combat platform capabilities. The SaaS ICD serves as the lynchpin for the ongoing development of four Soldier capability development documents: core, ground, air, and mounted. These documents specifically address the capability gaps addressed in the ICD. A brief status on capabilities needs approval follows.

Core Soldier. Currently, in the AROC approval process, the core Soldier system provides those clothing bag items and selected organizational clothing and individual equipment required by all Soldiers (basic uniform items, load bearing equipment). The initial operational capability will be achieved with completion of the Army's RFI program in FY07.

Air Soldier. Increment I (Air Warrior) is currently being fielded to the force based on the Mar 04 Joint Requirements Oversight Council (JROC)-approved ORD. Increment I provides air crewmen with Military Occupational Specialties (MOS) specific equipment (NOMEX uniform, flight helmet). Increment II capabili-

ties are under development with the goal of a Feb 06 JROC.

Mounted Warrior Soldier System (MWSS). The AROC approved the MWSS ORD in Mar 04; however, the program is only funded to equip one Stryker battalion in FY06. Like the SaaS MNS, the MWSS ORD has been converted using the JCIDS process and, as a result, it has entered into the AROC approval process. The MWSS provides combat vehicle crewmen with MOS-specific equipment (helmet, NOMEX overgarment). Increment II capabilities are under development with the goal of a Mar 06 JROC.

Land Warrior (LW). An LW Increment I/II Capabilities Production Document (CPD) is currently in the AROC approval process. The CPD supports an LW Stryker Brigade Combat Team (SBCT) limited user assessment in FY06 and provides the pathway for follow-on fieldings to SBCTs. The LW system integrates multiple Soldier systems and components and leverages emerging technologies to provide overmatching operational capabilities to all ground combatant Soldiers, their attachments and small units. These capabilities include increased C2, situational awareness (SA), lethality, mobility, survivability and sustainability. The Increment III (Ground Soldier System) CDD also has entered into the AROC approval process.

EOD Family of Systems. Another area of emphasis to enhance Soldier protection is the family of systems available to Soldiers in the Army's explosive ordnance disposal (EOD) units. These systems are critical to homeland security, force protection and support of the global war on terrorism. They provide EOD Soldiers at home and abroad with the capability to remotely examine, identify and render safe ordnance and IEDs effectively and safely. Lessons learned from OEF and OIF have increased the awareness and priority of EOD systems. Production of the Manual Transport Robotic System (MTRS) began in Sep 05. Future acquisitions will include the Submunitions Clearance System (SCS) and the Medium Directional Energy Tool (MDET) of the Large IED Countermeasures Family of Systems. MTRS and SCS are modified commercial acquisitions. MDET will be commercially produced from a government-developed drawing package and specification. SCS and MDET are new critical capabilities; MTRS provides an improved capability.

Combat Identification (CID). CID measures enhance Soldier protection and overall combat effectiveness by minimizing fratricide incidents. As a result of lessons learned during Operation Desert Storm (ODS) and past CID efforts, significant progress has been made to reduce fratricide. In OEF and OIF, the widespread use of thermal and infrared marking devices (combat identification panels (CIPs), thermal identification panels (TIPs), Phoenix infrared lights, as well as GPS systems, BFT systems, and Force XXI Battle Command Brigade and Below (FBCB2)) has significantly reduced fratricide incidents through an improved ability to locate and identify friendly forces on the battlefield.

These systems, combined with other CID measures such as tactics, techniques and procedures (TTP), rules of engagement (ROE), and incorporation of fratricide prevention training into institutional, individual

and collective training environments, are critical to minimizing fratricide in today's fast-paced, nonlinear, distributed, simultaneous, offensive-oriented battlefield environment. An interactive vehicle recognition training device called Recognition of Combat Vehicles (ROC-V) is being made available to Soldiers at all levels. ROC-V is issued on a CD for use on a personal computer to display visual and thermal imagery of vehicles. It also provides for self-assessment. Army Combat Training Centers (CTCs) have put in place measures to assess combat identification and situational understanding during unit rotations, and an aggressive program for capturing, reconciling, and leveraging lessons learned from OIF, OEF and CTCs to improve TTP, training and doctrine, and CID is a major focus area at the Center for Army Lessons Learned.

In FY02, due to affordability issues, the Army terminated the Battlefield Combat Identification System (BCIS) program that had been initiated following ODS to improve current force CID capabilities. The millimeter wave technology developed under that program was directed to be transferred to future force development efforts. In an effort to reinitiate a CID program, the Army G-3/G-8 in 2003 established a CID Overarching Integrated Process Team (OIPT) to provide an updated and approved CID concept and strategy, a CID action plan for current and future forces in a joint, interagency and multinational (JIM) environment, and a funding strategy to support an integrated DOTMLPF CID program in the FY08-13 FYDP that leverages advanced technology. Additionally, the Army Science Board was tasked by the Army Acquisition Executive to conduct a parallel, ad hoc CID study to assist the Army Staff in their review and synchronization of CID efforts.

In March 2004, the Army Marine Corps Board (AMCB), cochaired by Army G-8 and the U.S. Marine Corps Assistant Deputy Commandant, Programs and Resources and including three-star principals from the Army and Marine Corps staffs, conducted a review of CID efforts in the Army and Marine Corps and directed that a DOTMLPF-based study be conducted to develop recommendations of banded investment strategies for AMCB consideration.

The AMCB reviewed the CID study results in August 2004 and approved investment recommendations for CID that included the resourcing of low-cost/high-payoff improvements in DOTMLPF, equipping of 800 Abrams key leader tanks with second-generation FLIR, and continued procurement of the Joint CID Marking System (JCIMS)—thermal and infrared marking devices—for "go-to-war" requirements in support of United States Central Command (USCENTCOM) Operational Needs Statements.

The AMCB also agreed to support the ongoing Coalition Combat Identification Advanced Concept Technology Demonstration (CCID ACTD) S&T effort and to defer any decision on a CID technology until completion of the CCID ACTD. This U.S.-led multinational effort is designed to evaluate the military utility of advanced technologies to improve CID, minimize fratricide incidents, and provide increased combat effectiveness in joint, allied and coalition operations and includes the United Kingdom, France, Germany, Italy, Canada, Sweden, Denmark and Australia as participating partners.

The following candidate technologies were evaluated in the CCID ACTD: Battlefield Target ID Device (BTID) that consists of millimeter wave interrogator, millimeter wave transponder and communication-electronics unit; Optical Combat ID System (O-CIDS) that consists of a laser interrogator and optical

retro-reflector transponder; radio-based CID (RBCI) that consists of software modification to Single Channel Ground and Airborne Radio System (SINCGARS) Advanced System Improvement Program (ASIP), which enables shooters to interrogate areas of interest and receive replies from friends; and radio frequency (RF) tags, which are small electronic devices that detect radar signals, modulate the signal with CID data, and return the signal to the radar display.

CCID ACTD operational demonstrations were completed in the fall of 2005, and the operational manager, Joint Forces Command, is scheduled to provide military utility assessments for each of the technologies by March 2006. The AMCB will use the military utility assessments along with life-cycle costs estimated to make decisions regarding future CID investments for the Army and Marine Corps.

The Army's RFI, REF, EOD, CID and a host of other equipping efforts are challenging existing assumptions and processes to demonstrate a commitment to equipping Soldiers with the best equipment available and providing relevant and ready forces to the Combatant Commanders. We are an Army at war and will meet the current demands while always changing to meet future challenges.

Ground Soldier System (GSS)

Description. The GSS is a modular, integrated fighting system for ground combatant Soldiers that integrates many components and technologies into a lethal, survivable, mobile and more situationally aware Soldier system. Land Warrior systems/components include:

- Helmet subsystem with color helmet-mounted display and audio headset and microphone
- Weapon subsystem with day light video sight and multifunctional laser with digital compass
- Communication, navigation and computer subsystems
- Soldier control unit
- Enhancements to protective clothing and individual equipment

The systems approach optimizes and integrates these capabilities, to include interface with the Army Tactical Internet, while reducing the logistical footprint. S&T advances in warfighting concepts, system-of-systems (SoS) architectures, and technology components in areas such as enhanced navigation, system voice control, weight reduction, digital connectivity and power are being pursued through the Future Force Warrior (FFW) Advanced Technology Demonstration (ATD) and will be inserted over time as the technology matures to meet GSS requirements. The FFW ATD is also charged with developing an analysis-of-variants system design concept that will enable expansion of the FFW concept to the other Soldier variants. This concept will contain design hooks and interfaces common to all Soldiers, providing a tailorable and reconfigurable SoS design extensible to all Soldiers.

Program Status. The LW II (Stryker interoperable) program has been restructured to accommodate redefined current force requirements. The Army will provide enhanced situational awareness/battle command and lethality capability to small, tactical units in the near term. The Army is testing LW II ensemble variants as potential solutions. In FY06, the Army will equip an SBCT task force with LW II (440 systems) and Mounted Warrior (MW) (147 systems) to conduct a DOTMLPF assessment, which combined with other lim-

ited user tests (LUT) will support a milestone decision in FY07. In the far term, the program is focused on the GSS development. GSS incorporate developing technology advances

to improve LW system capabilities. Throughout the LW development, the Army will seek opportunities to field mature capabilities to the force early, before the fully integrated LW/GSS system is available for fielding.

Mounted Warrior (MW)

Description. The MW Soldier System (MWSS) provides the dismounted and mounted combat crew members with uninterrupted viewing of their immediate surroundings while remaining connected to onboard platform command, control, communications, computers and intelligence (C4I) capabilities, thereby providing crews with continuous situational awareness and communications with platform and dismounted Soldiers. The MWSS ensemble includes a helmet subsystem (advance combat helmet, head-mounted display for vehicle commanders, and improved audio headset and microphone); cordless communications; protective clothing/individual equipment subsystem (crew member overgarments; gloves; footwear; ballistic protection; chemical/biological (CB) protective mask; CB protective overgarments; CB protective gloves and footwear; and ballistic/laser, sun, wind and dust eye protection).

Program Status. The Army is buying 147 MW systems for a DOTMLPF assessment in FY06.

Air Warrior (AW)

Description. AW is a Soldier system for helicopter crewmen that provides a new generation of integrated, mission-tailorable, combat-effective life support equipment and chemical/biological protection with reduced weight/bulk designed to improve aircrew endurance, mobility and performance. AW significantly improves flight time in Mission Oriented Protective Posture (MOPP) 4 gear from 1.6 to 5.3 hours. Air Warrior systems/components include:

- Microclimate cooling system that includes a microclimate cooling garment (MCG) and a small microclimate cooling unit that chills water and pumps it through small tubes embedded in the MCG
- Survival equipment subsystem that includes a survival gear carrier, soft and hard body armor, thigh holster and survival knife in ankle sheath
- Interim Modular Integrated Helmet Display System (MIHDS) with laser eye protection and a night vision device mount
- Over-water survival subsystem that includes a personal flotation device, survival egress air (breathing oxygen), and an

inflatable raft (LRU-18U) that is integrated into the ensemble and worn by the crew member

- Nuclear, biological and chemical (NBC) protection with a modified chemical protective undergarment, M45 or M48 protective mask with blower unit, gloves and overboots
- Aviation clothing items that include modified aircrew battle dress uniform (BDU) and the Aircrew Cold Weather Garment System

Future AW system spiral development improvements focus on the technology insertion of improved and/or enhanced components reflecting emerging technologies defined in AW Blocks 2 and 3.

Block 2 developmental efforts are underway and will add an Aircraft Wireless Intercom System (AWIS) and the Electronic Data Manager (EDM). The AWIS will enhance crew member performance by providing the capability for wireless communications within the aircrew and with ground crew or ramp support personnel such as in a tactical forward area rearm and refueling point (FARRP). The EDM, in the form of a digital kneeboard, will provide a capability to the aircrew to generate, store, display and distribute digital information and will interface with BFT systems.

Block 3 efforts will increase performance and capabilities by adding a fully compliant MIHDS helmet. The MIHDS helmet will provide, as a baseline, the same safety performance characteristics as the HGU-56/P helmet (impact, sound attenuation, retention, etc.). The MIHDS will be tailorable and compatible with the Apache helmet-mounted displays and head tracking technologies and will also provide an improved day/night helmet-mounted display symbology for those aircraft that currently lack this feature. These helmet-mounted displays will be compatible with aircrew prescription spectacles, CB protection, oxygen masks, laser eye protection and nuclear flash protection technologies. CB protection will be donned in-flight without removing the helmet.

Program Status. AW Block 1 production began in FY03 and fielding began in 2QFY04 to the 3-4 Cavalry. Block 2 development began in FY02 with equipping for some units beginning in FY05. Block 3 development began in FY04.

Enhanced Night Vision Goggles (ENVG)

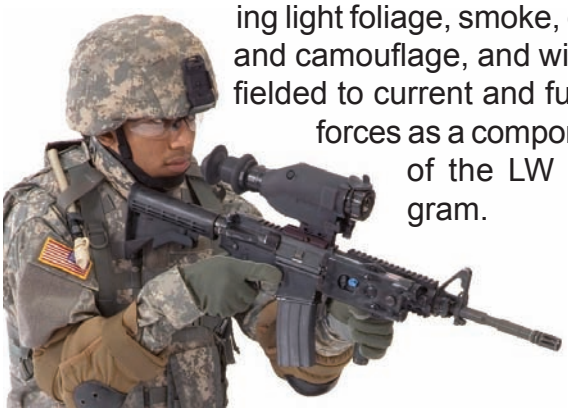
Description. The next generation of night vision goggles for the Soldier is the ENVG. It combines both an uncooled thermal and an image-intensification (I2) capability into a single integrated device. ENVG improves Soldier situational awareness by providing the capability to rapidly detect and recognize man-sized targets while simultaneously maintaining the ability to see detail and to use rifle-mounted aiming lights. The ENVG provides Soldiers with the ability to engage and execute close combat in all levels of light, to include the zero-illumination conditions found in caves and underground environments, adverse weather conditions and under battlefield obscurant conditions. This is a system component of the Soldier Warrior programs.

Program Status. The ENVG is currently in developmental testing with reliability tests scheduled for 1Q-2QFY06. Contractor pre-qualification testing will be performed concurrently. A combined developmental testing/operational

testing (DT/OT) is scheduled for 3QFY06 with a Milestone C decision to follow in 4QFY06.

Thermal Weapon Sights (TWS)

Description. Thermal Weapon Sights are a family of low-cost, lightweight, man-portable IR imaging devices of high resolution to be used for surveillance and fire control of individual and crew served weapons during both daylight and darkness. TWS operate in adverse weather and dirty battlefield scenarios including light foliage, smoke, dust and camouflage, and will be fielded to current and future forces as a component of the LW program.



Program Status. The TWS program is in FRP with more than 19,000 light, medium and heavy systems having been fielded. Next generation Thermal Weapon Sights II are currently completing DT and LUT. TWS II systems offer improved performance in a lighter-weight, lower-cost package. TWS II system fieldings will commence 2QFY06.

XM307 Objective Crew Served Weapon (OCSW)

Description. The XM307 is a close combat support weapon that will enable Soldiers/platforms to quickly react with a high-volume fire against troops in the open and in defilade and lightly armored vehicles. The XM307 will provide the ability to engage targets out to 2,000 meters under day/night and adverse weather conditions while stationary and on the move, and at elevations from -20 degrees to +60 degrees. The XM307 will fire high-explosive

airburst, armor-piercing and nonlethal ammunition. The XM307 weighs approximately 50.3 pounds. The dismounted version of the XM307 includes a lightweight tripod with a traverse and elevation (T&E) mechanism capable of providing high weapon portability and rapid target engagement. It also includes a full-solution fire control that includes direct-view optics, full-solution ballistic calculation, digital range finder, CCD video, tracker module, digital compass, environmental sensors, as well as many other options. The remote operating variant (ROV) of the weapon will have an automatic ammunition feeding system, to include a dual feeder capable of a first-round response.

The XM307 is being considered to replace selected M2 and MK19 grenade machine guns. The Army is still conducting mission analysis and completing capabilities documentation for this system.

Program Status. The XM307 program transitioned from the tech base in FY04. The Milestone C decision for the ROV is scheduled in 1QFY09.

Lightweight Laser Designator Range Finder (LLDR)

Description. The LLDR is a man-portable, modular, target location and laser designation system. The system consists of a tar-

get locator module (TLM) and a laser designator module (LDM). LLDR provides Soldiers with a man-portable capability to observe and accurately locate targets, digitally transmit target location data to the tactical network, and laser-designate high-priority targets for destruction by precision munitions. LLDR greatly increases the ability to recognize targets at night and under battlefield conditions.

Program Status. LLDR is currently in FRP. Conditional material release is expected in 2QFY06.

Nonlethal Capabilities Sets (NLCS)

Description. The shifting military environment is likely to see greater mixing of enemy combatants with noncombatants and there are likely to be situations where deadly force is undesirable. Nonlethal capabilities are a family of systems that employ means other than gross physical destruction to prevent, disrupt, incapacitate, disable, neutralize or impede the target from functioning while minimizing unintended casualties and collateral damage. These include weapons commonly referred to as nonkinetic, less-than-lethal and/or low collateral damage weapons.

The NLCS can be rapidly deployed by military transport or commercial carrier. NLCS consists of six categories: counterpersonnel systems, countermateriel systems, protective equipment, enhancement devices, training devices/allocations and support equipment.

Program Status. The NLCS is being fielded to units supporting and preparing to support OIF/OEF. The initial fielding of 96 sets were delivered in summer 2005 with additional sets being procured during the FY06-11 program plan cycle.

Ground Force Modernization

Annex B, Organizations, of the *2006 Army Modernization Plan* provides details on the Army's two primary ground force modernization efforts, the accelerated development and fielding of seven SBCTs from 2001 to 2008 and the Future Combat Force Strategy aimed at the development and initial fielding of a maneuver brigade equipped with FCS to bring future modular force capabilities into the current force. The Unit Set Fielding process will field these units with capabilities achieved from a complete set of unit equipment. Under the SoS approach, the unit must demonstrate the ability to operate interdependent systems together to achieve an IOC for the unit. In FY03, the first SBCT completed fielding and operational testing to achieve IOC. Since then, both the second and third SBCTs have also been fielded and deployed for operational missions in Iraq. Part of the modernization effort is the transformation of the current force to modular BCTs that are similar in organizational structure to the SBCT organization. The BCT will serve as the base unit for the spin-out fielding that will accelerate FCS technologies into the force.

Stryker Brigade Combat Team (SBCT). The SBCT is inherently a precision unit. The force design of the SBCT provides the Army with dominant maneuver and precision engagement capabilities not found in any other Army brigade-sized unit. Specifically, the RSTA squadron, equipped with unmanned aerial vehicles (UAVs) and ground-based HUMINT specialists, provide the commander

with unequalled situational understanding. The networked command and control architecture that features FBCB2, allows the commander to provide the same picture to lower echelons and major combat platforms, such as the Stryker vehicle, thereby establishing a real-time friendly force operational picture for the unit. The SBCT also features organic, ground-based sniper teams—the essence of precision strike and a critical combat requirement that has once again been validated during the ongoing war against terrorism.

The SBCT's force application capability is truly global. C-130 transportable, the unit can rapidly deploy to austere environments, thereby overcoming enemy area-denial and anti-access efforts, and can quickly mount offensive operations with minimal reception, staging and integration. Although it excels in the midpoint of the operational spectrum, it can fight effectively as a fully committed unit in major engagement and battles with augmentation (such as attack aviation and/or rocket artillery). With its superior tactical mobility and excellent battlefield situational awareness, the SBCT can also execute difficult security missions such as guard, cover, screen, counterreconnaissance and rear-area combat operations. The superior off-road maneuverability of the Stryker vehicle, combined with its dismounted infantry assault capability featuring robust anti-tank weaponry, ensures the SBCT can very effectively engage and destroy enemy armor in close, complex and/or urban terrain.

The Army is currently benefiting from the capability of the SBCT in operational missions in Iraq. The unit is maximizing the capabilities of this transformational organization in combat operations. Examples are increased speed (60+ miles per hour) and survivability (protection against rocket-propelled grenades (RPGs) and IEDs) provided by the Stryker family of vehicles in the brigade; near-seamless situational awareness down to the combat vehicle crew level allowing quick execution of changing missions; high rate of reliability of the Stryker vehicles; and high confidence in the vehicle and its capabilities by the Soldiers in the brigade.

The capabilities of the SBCTs will be operationally enhanced when the remaining two variants, the Mobile Gun System (MGS) and the NBC Reconnaissance Vehicle (NBCRV) are fielded in FY06 and FY07. The MGS provides rapid and lethal direct fire to support assaulting infantry and the NBCRV provides NBC situational awareness to increase the combat power of the BCT.

Future Combat Force Development

The future combat force concept embodies precise and dominant maneuver coupled with precision engagement through a combination of maneuver, fires and information dominance. As an offensive-oriented force, it conducts operational maneuver from strategic distances, executing synchronized, distributed operations as part of a joint force to destroy key enemy capabilities in a distributed, nonlinear battlespace. It provides seamless C4ISR, FCS, integrated sensors, attack and reconnaissance helicopters, expanded maneuver and fires with standoff, LOS and non-line-of-sight (NLOS) capabilities. These

attributes enable the Joint Force to achieve total disintegration, dislocation and destruction of enemy forces from tactical through operational levels. Direct lethal action will contribute to the following joint efforts:

- Destroy and degrade enemy anti-access systems such as long-range missiles and artillery, unconventional forces, enemy surveillance and targeting capabilities
- Participate in the destruction of enemy precision engagement systems. This represents a key task, given the significant threat that enemy systems represent to Joint Force freedom of action and maneuver
- Seize key terrain and facilities required to support force flow and decisive operations, extension of the area of influence, and isolation of enemy forces
- Degrade key enemy capabilities (C4, ISR, and logistical structures) essential to enemy offensive operations
- Provide essential C4, ISR and logistical support to the Joint Force
- Support the Joint Force commander's information operations to gain momentum superiority

FCS-Equipped Maneuver Brigade. Although the Army has not finalized a complete future combat force design, it has approved an organizational and operational (O&O) plan for a maneuver brigade equipped with FCS.

This brigade's organizational design includes UAS at each echelon to enhance the organization's RSTA capability. This capability is viewed as essential to the success of brigade operations to build and maintain situational awareness and understanding before, during and after tactical operations. An aviation squadron within the brigade will integrate with UAS to provide a robust reconnaissance capability with manned and unmanned aviation (man-in-the-loop) in support of the brigade mission. Additionally, they will engage to destroy high-payoff or most dangerous target sets with organic weapons or by employing external networked fires under brigade control.

The NLOS battalion is the brigade's primary provider of destructive, suppressive, protective and special purpose fires that enable the brigade to conduct decisive operations. It is envisioned that the NLOS Cannon (NLOS-C) will provide accurate, reliable, responsive, on-demand, 24-hour, all-weather, all-terrain and close-supporting fires with a wide array of precision and nonprecision munitions. The NLOS Launch System (NLOS-LS) provides a networked system of missile launchers with command and control systems that will provide both precision and loitering attack munitions. NLOS Mortar (organic to the combined arms battalion) will also provide supporting fires to the brigade. The combination of NLOS Mortar, Cannon and Launch Systems in the brigade, and High Mobility Artillery Rocket System (HIMARS) in the division will provide the future commander with a greatly increased precision and lethal capability.

Discussion of Key Ground Force Materiel Programs

Abrams Tank

Description. The Abrams tank modernization strategy supports the Army Campaign Plan by providing the Abrams tank the lethality, survivability and fighting ability necessary to defeat advanced threats well into the future. The Abrams tank closes with and destroys enemy forces on the integrated battlefield using mobility, firepower and shock effect.

The 120-mm main gun on the M1A1 and M1A2 family of vehicles, combined with the powerful 1,500-hp turbine engine and special armor, make the Abrams tank particularly suitable for attacking or defending against large concentrations of heavy armor forces on a highly lethal battlefield, and has proven it's lethality in urban operations during Operation Iraqi Freedom in support of the global war on terrorism. The Abrams recapitalization program is a modernization program focused on the current heavy armored force and seeks to ensure the Abrams main battle tank remains relevant to the developing future combat force.

The Army has a recapitalization procurement and modernization strategy under the Abrams Integrated Management (AIM) program that provides M1A1 tanks with rebuilt AGT1500 engines and improvements to selected tank subsystems that bring the tanks to a zero-hours/-miles rebuild condition. The AIM program provides selected technology insertions designed to extend the service life of the fleet while reducing O&S costs. Some of these improvements include revised hull and turret network boxes, a digital electronics control unit, a driver's hatch interlock sensor system, an upgraded tank commander's panel, an eye-safe laser range finder, a pulse jet air system, and a battlefield override (mechanical fuel and transmission bypass) system. A development and integration effort leading to the insertion of a single second-generation thermal sensor in the gunner's primary sight is currently underway.

The M1A2 SEP program began in FY99 and selectively upgrades M1 tanks or retrofits M1A2 tanks with rebuilt critical components that bring the tanks to a near zero-hours/zero-miles condition. M1A2 SEP tanks have a second-generation FLIR sensor in the commander's independent thermal viewer (CITV) to enhance target acquisition and significantly improve lethality, hardware and software that supports Army digitization and the FBCB2 system, digital diagnostics system that enhances tank maintenance and sustainment, thermal management system that reduces the tank's battlefield signature, and an improved armor system that improves survivability against emerging threats.

The Abrams modernization strategy also includes a major improvement program for the current AGT1500 engine coined the Total Integrated Engine Revitalization (TIGER) program. This effort serves to execute an integrated program that will sustain the AGT1500 engine for the benefit of the entire Abrams tank fleet with an average mean time between depot replacement (MTBDR) of 1,400 hours. The TIGER program establishes a single standard for overhauled engines, addresses current readiness issues, improves durability, reduces O&S costs and implements automated data collection in support of fact-based maintenance decisions. The development of the TIGER program continued through FY05, with procurement beginning in FY06.

Program Status. The Army completed fielding of M1A2 SEP tanks to the 4th Infantry Division (ID) and the 1st Cavalry Division. Efforts are underway to field M1A2 SEP tanks to the 3rd Armored Cavalry Regiment beginning in FY06. Currently, the Army is projected

to procure 803 M1A2 SEP tanks. The Army completed fielding M1A1 AIMs to 2nd ID and modernization of the ARNG continues through cascading of M1A1 AIM tanks from the AC.

Bradley Fighting Vehicle

Description. The Bradley recapitalization program rebuilds and upgrades M2/M3A2s to the most modernized M2/M3A3 configuration. The A3 adds two second-generation FLIR devices (one in the commander's independent viewer (CIV) and one in the improved Bradley acquisition sight (IBAS)), a position/navigation (POS/NAV) system, core electronic architecture, and digital C2. These upgrades improve the crew's ability to navigate, pinpoint and identify friendly and enemy positions, and engage two separate targets nearly simultaneously in both day and night conditions. Also, the digital C2 provides a near real-time integrated data link between the M2A3 and other combat vehicles and headquarters.

Program Status. The 1st Cavalry Division and 4th ID will be fielded with M2A3 Bradleys in FY07. The 3rd ACR will be fielded with recapitalized Bradley cavalry/scout vehicles. Selected III Corps engineer battalions will be fielded with 342 converted M3A2 ODS-D vehicles. The Army engineer companies will be fielded with Bradley ODS-E vehicles. These digitized vehicles will vastly improve the lethality, survivability and situational awareness for the engineers and supported units.

Stryker Family of Armored Vehicles

Description. The Stryker Family of Armored Vehicles is the centerpiece combat and combat support platform for the SBCTs. Two variants of the Stryker will be fielded: the Mobile Gun System (MGS) and the Infantry Carrier Vehicle (ICV). There will be eight additional configurations of the ICV: Reconnaissance Vehicle (RV), Mortar Carrier (MC), Commander Vehicle (CV), Fire Support Vehicle (FSV), Engineer Squad Vehicle (ESV), Medical Evacuation Vehicle (MEV), Anti-tank Guided Missile Vehicle (ATGM), and Nuclear, Biological and Chemical Reconnaissance Vehicle (NBCRV). Stryker capabilities include:

- Strategically responsive and deployable on the complete U.S. Air Force (USAF) family of transport aircraft, C-130 and larger
- Roll-on/roll-off combat capable with minimum preparation
- Superior situational awareness with internetted/networked communications
- Survivability enhanced by all-around 14.5-mm armor piercing and 152-mm artillery airburst protection (add-on armor provides protection against RPG anti-tank weapons)
- Accurate target acquisition with Long-Range Advanced Scout Surveillance System (LRAS3) mission package

- Accurate target engagement with Remote Weapon Station (MK19 grenade launcher and/or M2 .50 caliber machine gun)
- Decisive offensive action with dismounted infantry assault (ICV)
- Bunker-busting capability with 105-mm cannon (MGS) for roles in immediate fire support of dismounted infantry operations and with tube-launched, optically tracked, wire-guided (TOW) bunker-buster munitions (ATGM)
- Responsive indirect fires with 120-mm mounted mortar (MC)
- Anti-tank capability with TOW 2B (ATGM) and Javelin-equipped dismounted infantry (ICV)
- Mobility enhanced by mine plow, roller and detector (ESV)
- Integrated NBC sensor capability (NBCRV)

The Stryker provides a unique family-of-systems approach that maximizes commonality and integrated capabilities while filling an immediate capabilities gap in the current force. Supporting Stryker fielding is a complete new home station equipment training package for both operators and maintainers.

Program Status. Planned procurement is for 2,559 vehicles consisting of two variants: ICV and MGS. The Stryker program obtained an FRP decision on seven of the 10 variants in Feb 04; these include the ICV, RV, CV, FSV, ESV, MEV and ATGM. The Army has funded, and the Secretary of Defense (SECDEF) has authorized, the procurement and fielding of seven SBCTs to fulfill the defense strategy and national security requirements.

Lightweight 155-mm Howitzer (M777)

Description. The Army has a requirement for an advanced, towed, lightweight 155-mm howitzer, with self-locating and aiming capability, that meets increased operational thresholds for mobility, survivability, deployability and sustainability. The M777 lightweight 155-mm howitzer is funded in the FY07-11 program plan as a weapon system that meets this requirement. A joint USMC/Army program, the M777 will provide accurate, reliable, responsive, on-demand, 24-hour, all-weather and all-terrain close support fires to maneuver forces.

Program Status. In Nov 02, the M777 entered LRIP for 94 USMC nondigitized howitzers to be delivered in FY04 and FY05. The FY07-11 program plan funds the procurement and fielding of the digitized, self-locating, self-aiming/-pointing upgrade of this system (M777E1) to selected Army units, beginning with the SBCTs in FY06-08. USMC howitzers will be retrofitted for the digitized upgrades once fielding to Army units begins. A successful multi-Service operational test and evaluation (OT&E) was completed in Nov 04. The program received authorization to move forward with multi-year production from the Assistant Secretary of the Navy, Research, Development and Acquisition (ASNRDA) on

23 Feb 05, and a four-year multi-year production contract was awarded to BAE Systems on 22 Mar 05. Fielding to USMC artillery units is currently in progress. The first Army unit fielded will be SBCT 5 commencing in 4QFY06.

M119A2 Lightweight 105-mm Towed Howitzer

Description. The M119A2 has been in service since 1989 and is used by the Army's light forces to fulfill the direct support artillery mission within those units. The decisions to pursue modularity and convert the ARNG to a pure fleet of M119A2s (and remove the M102 from inventory) have roughly doubled the Authorized Acquisition Objective (AAO) for M119A2s to 814 systems. This requirement has driven the need to reenter production and produce 432 additional M119A2s. Furthermore, an Army Force Generation (ARFORGEN) alignment has been recommended to upgrade and return currently fielded M119A2 assets to a fully serviceable condition . These assets in most instances have been to theater at least once, if not more. This effort will have the effect of reducing O&S costs to the AC where the usage rates are the highest and provide the ARNG with fully serviceable and upgraded weapons.

Program Status. Funding to begin the program and initiate production was received in the FY05 Supplemental. A make/buy decision was made to produce the howitzers at Rock Island Arsenal. Using the FY05 Supplemental funding, long-lead materials have to be placed on order and manufacturing activities to produce the initial year's order quantity of 35 weapons have begun. The first delivery of a complete new production M119A2 is currently scheduled for Apr 07. After production testing is completed, materiel release is expected by the end of 1QFY08. Fieldings would then commence in 2QFY08.

Future Combat Systems (FCS)

Description. The core of the future combat force's maneuver brigade is the FCS, comprised of 18 manned and unmanned platforms centered around the Soldier and integrated by a secure battle command network. FCS will provide Soldiers with significantly enhanced situational awareness—enabling them to see first, understand first, act first and finish decisively. This allows the Joint Force to achieve overmatching combat power with the lethality, agility, sustainability and versatility necessary for full-spectrum military operations from small-scale contingencies to stability and support operations to major combat.

The FCS comprises a family of advanced, networked, air- and ground-based maneuver, maneuver support and sustainment systems. FCS employs a revolutionary, integrated architecture to help meet the commander's requirements. These networked capabilities include networked communications, networked operations, sensors, battle command systems, training platforms, and both manned and unmanned reconnaissance and surveillance capabilities. These capabilities will enable improved situational understanding and operations at a level of synchronization heretofore unachievable.

Program Status. The first major step for the FCS was achieved in May 03 with the successful approval of the Milestone B decision. This decision confirmed the feasibility of technology and initiated implementation of the original acquisition strategy to achieve an IOC in 2010 and a full operational capability (FOC) by 2012. In Jul 04, the FCS program was restructured to reduce program risk while simultaneously improving the current force

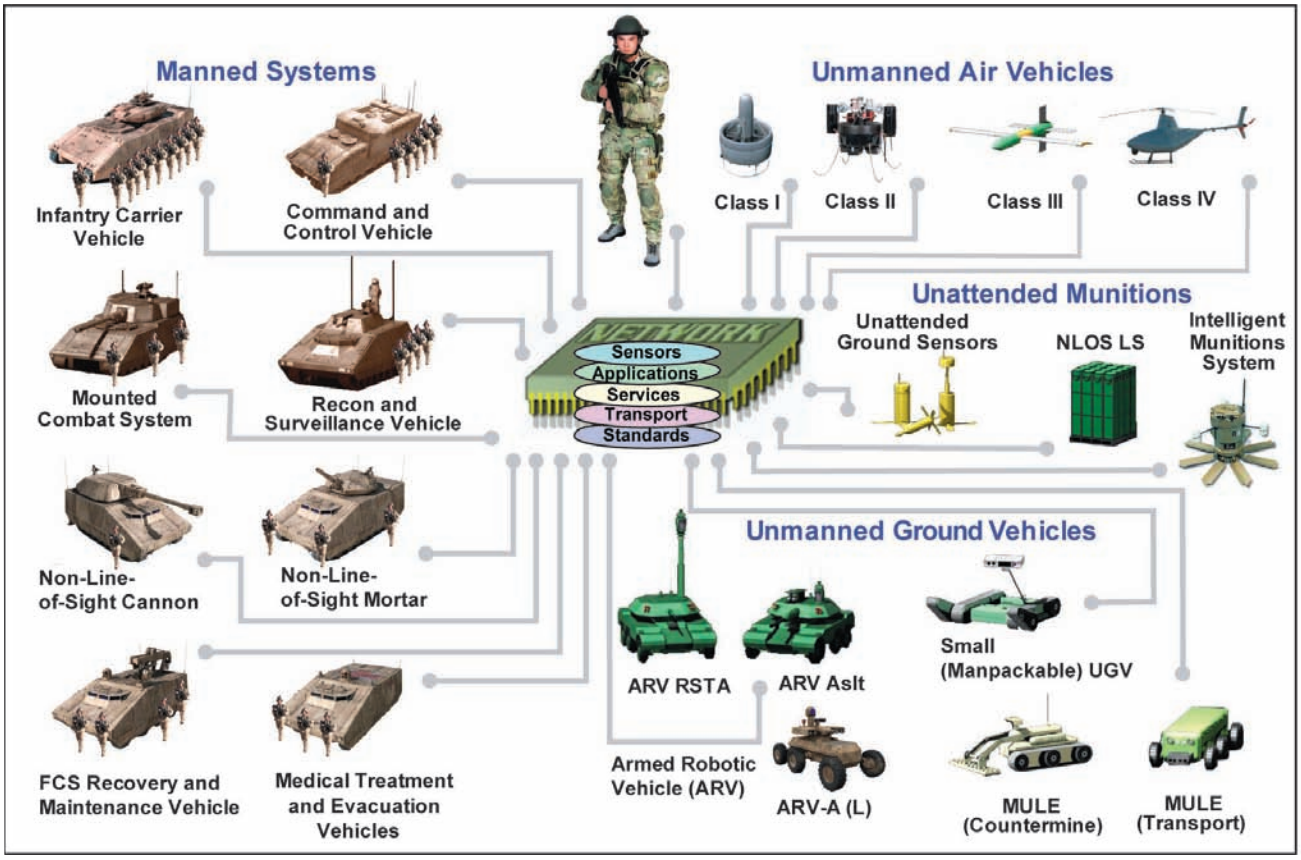


Figure D-6. Future Combat Systems

with the insertion of FCS technologies that will close current force capability gaps while maintaining the Army's focus on FCS development. This will result in an FCS-equipped brigade (all 18 + 1 systems) IOC in 2014 and FOC in 2017. The acceleration of FCS technologies will be accomplished by a series of four spin outs into modular BCTs (heavy, infantry and Stryker).

The first of four spin outs will begin in FY08 with test and evaluation (T&E) by a single current force unit (evaluation BCT or EBCT) that will serve as the consistent organization for the development and evaluation of FCS-related systems. Spin Out 1 will start fielding to the current force in FY10. Subsequent spin outs will be fielded initially to the EBCT, then to select current force modular BCTs. The priority of the spin-out effort is initially to the network, unattended munitions and sensors, and unmanned systems. Elements of the network will be spun out into each of the four spin outs. Manned Ground Vehicle (MGV) development will be extended to meet the 2014 IOC date for the first FCS-equipped brigade. However, the NLOS-C will lead MGV development and deliver prototype NLOS-C systems in 2008 and begin fielding Block 0 NLOS-C systems in 2010.

Non-Line-of-Sight Cannon (NLOS-C)

Description. The NLOS-C is currently embedded in the overall FCS program architecture. The NLOS-C will provide accurate, reliable, responsive, on-demand, 24-hour, all-weather and all-terrain close supporting fires as an integral part of the future combat force. It will utilize the Modular Artillery Charge System (MACS) and inductively set fuses, such as the M762/A1, M767/A1 and multiple

option fuze, artillery (MOFA). As the primary fire support asset available to the FCS maneuver brigade commander, it will provide sustained fires capability for both precision (Excalibur) and area fires (suppression) to forces in combat and are networked to joint fires. Its networked capability and high rate of fire enable it to provide rapid fires at extended ranges. System development will be integrated with the development of a suite of munitions and complementary ISR capabilities that locate, track, identify, engage and destroy all target types with effects scaled by the mission and target set.

Program Status. The Army, in partnership with the Defense Advanced Research Projects Agency (DARPA) established in 2002 an aggressive, collaborative demonstration program in support of the FCS initiative. This demonstration included both live-fire and mobility phases. NLOS-C transitioned to SDD as a component of FCS. The Army is working to comply with the law to field the NLOS-C starting in FY10. The Army will deliver eight prototype NLOS-C systems in 2008 to support the FY10 fielding. Additionally the NLOS-C will influence the MGV risk reduction efforts, early user evaluation by the EBCT and system level testing. Test firing of the NLOS-C system demonstrator continues at Yuma Proving Ground, AZ, as well as proof of concept demonstrations for vehicle weight, and the hybrid electric drive risk reduction. The NLOS-C mission module and four common (propulsion, suspension, environmental control and vetronics) subsystems enter detailed design in late 2005 in support of prototype deliveries beginning in 2008.

Non-Line-of-Sight Launch System (NLOS-LS)

Description. The NLOS-LS is a core program of the FCS and is a networked system of missile launchers with an integrated command and control system that will provide precision and loitering attack munitions (PAM and LAM). It will provide accurate, reliable, responsive, on-demand, 24-hour, all-weather and all-terrain fires as an integral part of the future combat force. NLOS-LS will provide networked, extended-range targeting and precision attack of armored, lightly armored and other stationary and moving targets during day, night, obscured and adverse weather conditions. The system's primary purpose is to provide responsive precision attack of high-payoff targets (HPT) in support of the FCS maneuver brigade in concert with other FCS maneuver brigade NLOS systems as well as other Army, JIM system capabilities. The PAM has the ability to provide a discriminating capability via automatic target acquisition (ATA) and contribute to BDA. Future planned improvements include the addition of low-cost, tri-mode capability to the PAM. The system has flexibility to respond to all FCS maneuver brigade sensors, SOF, and other division, joint and multinational elements. The NLOS-LS will be a self-contained system with multifunctional munitions capability. The system will be capable of multimodal transport and be fired from the ground or from manned/unmanned tactical transport vehicles. NLOS-LS consists of the container launch unit (CLU) housing individual containerized munitions, PAM and LAM, and an onboard command and control capability. The system has an external mission planning software application designed

to operate on the future battle command system for planning and execution of multiple and simultaneous missions, including engagement with different munitions.

Program Status. The NLOS-LS transitioned to an Army SDD effort in FY04. An NLOS-LS Project Manager's Office was formed in Jul 05 under PEO Missiles and Space to facilitate the transition and coordinate actions to ensure initiation of NLOS-LS Block I SDD. The system will be fielded to the EBCT in limited quantities in 1QFY08 with the PAM capability. The LAM is still in the concept and technology development stage. Program Milestone C and LRIP are in FY09.

High Mobility Artillery Rocket System (HIMARS)

Description. The M142 HIMARS provides joint early entry forces, SOF and BCTs with continuous highly responsive, all-weather, precision, medium- to long-range rocket and missile fires to a depth of 300 km. HIMARS units are organic and assigned to modular fires brigades that provide integral fire support for BCTs. HIMARS fills the gap in range between direct-fire systems, short-range artillery systems, and longer range air systems. Mounted on an Family of Medium Tactical Vehicles (FMTV) chassis, HIMARS is C-130 transportable and combat loaded, and provides full Multiple Launch Rocket System (MLRS) family of munitions (including GMLRS and ATACMS) capability, yet requires 70 percent fewer airlift resources to transport than the current M270 MLRS launchers. HIMARS Advanced Concept Technology Demonstration (ACTD) prototype launchers were successfully employed in OIF, providing precision fires in support of USSOCOM and USCENTCOM operations. Firing GMLRS-Unitary precision rockets, HIMARS can support to a range of 70 km with low-collateral damage that enables the effects to be within danger-close proximity to friendly forces (within 200 m), as well as engaging targets in urban and complex environments. Employing ATACMS Quick Reaction (QR) Unitary, HIMARS can extend low-collateral precision attack to 270 km.

Program Status. HIMARS is type classified standard and is in FRP. The 3-27 Field Artillery, XVIII Airborne Corps, FUE, will become fully operational during 1QFY06. Subsequent HIMARS fielding is ongoing.

Discussion of Key Ground Force Family of Munitions

Army Tactical Missile System (ATACMS) Family of Munitions (FOM)

Description. The ATACMS FOM provides the Joint Force commander with a surface-to-surface, all-weather, responsive, deep-strike weapons capability for the attack of area and point targets from ranges of 25-300 km. ATACMS has been produced since 1990 in a logical series of improvements to range, accuracy and lethality. ATACMS Block I proved its effectiveness during Operation Desert Storm. A significant number of Blocks I, IA and QR Unitary were successfully employed in OIF in support of USAF, USMC, USSOCOM and USCENTCOM operations. Payloads

include anti-personnel, anti-materiel (APAM) bomblets and a 500-pound, high-explosive unitary warhead. ATACMS Unitary missiles provide near point-hit, low collateral damage, precision attack against targets in urban and complex terrain. The entire ATACMS FOM is launched from improved MLRS M270A1 and HIMARS rocket and missile battalions which are organic and assigned to modular fires brigades supporting joint early-entry forces, SOF and BCTs.

Program Status. The FY07-11 program funds procurement of ATACMS Unitary missiles and initiates a Service Life Extension Program (SLEP) for Block I and IA missiles that are approaching the end of their shelf life.

Chemical Energy Missiles—Javelin and TOW 2B

Description. The Javelin missile provides dismounted infantry with a medium-range, man-portable, simple-to-operate, shoulder-launched, fire-and-forget, economically maintained, rugged and reliable anti-armor weapon system that provides a highly formidable capability able to defeat all known armor threats for the dismounted close fight. As a fire-and-forget missile with top and direct attack modes and 2.5 times the range, Javelin is a leap-ahead improvement over the Dragon system. Javelin has two major components: a reusable command launch unit (CLU) and a missile sealed in a disposable launch tube assembly. Moreover, the Javelin's CLU incorporates an integrated day/night sight and greatly improves battlefield surveillance and survivability. Javelin has fire-and-forget technology that allows the gunner to lock on to the target, fire the missile, and immediately take cover. Other features include a tandem warhead, an imaging IR seeker and a soft launch that allows the missile to be fired from enclosures. In addition to its high lethality, Javelin is ideally suited to rapid deployment due to its size, high reliability and very small logistics tail. The Javelin has won high praise from commanders engaged in combat operations during OEF and OIF. Lessons learned from OEF/OIF operations are shaping the Javelin preplanned product improvement (P3I) program.

Program Status. Javelin FUE was Jun 96 with FRP beginning in May 97 and scheduled to continue through FY09. Javelin is currently being fielded to infantry, armor scouts and combat engineer units. The Block I program includes improvements in the CLU for better target detection, recognition and identification, and extended surveillance time; the missile includes improved performance at maximum range, reduced flight time and reduced acquisition time. The Feb 04 joint requirements validation of the Stryker ORD included a revision to integrate the Javelin into the Stryker Remote Weapons Station (RWS) on the ICV variant of the Stryker vehicles.

The Javelin weapon system is part of the FCS, dismounted with the ICV. The Javelin Block II missile is a complementary system to the FCS and will provide the Armed Robotic Vehicle-Light with a lethality overmatch.

Description. The TOW weapon system is a crew-portable, vehicle-mounted, heavy anti-armor weapon system designed to defeat armored vehicles and other targets such as field fortifications. The TOW weapon system provides the heavy anti-armor/assault capability for the Army's infantry forces (airborne, air assault, light, SBCT and Bradley-equipped mechanized) and the USMC forces with the TOW-equipped HMMWV, Light Armored Vehicle (LAV) and Cobra helicopters. The TOW family of missiles provides a man-in-the-loop, precision-point targeting capability, which serves to minimize collateral damage—a preeminent consideration in current and emerging operating environments. During OIF, the TOW missile fired from the Improved Target Acquisition System (with second-generation FLIR, won accolades from the 101st Airborne Division (Air Assault) for the decisive role these systems played in enabling the division to employ precision fires to destroy enemy forces while also avoiding collateral damage. The modernized TOW 2B (Aero) missile provides even greater range and countermeasure defeat to TOW-equipped units and will mitigate TOW inventory risk. The TOW Bunker Buster (TOW BB) missile was fielded to the first SBCT in Nov 03 as an in-lieu-of mitigation item for the Stryker ATGM until the Stryker MGS is fielded.

Program Status. The Army program plan maintains a minimum production line sustainment rate.

Improved Target Acquisition System (ITAS)

Description. ITAS provides long-range, lethal, heavy close combat and precision assault fires capabilities for light infantry forces and SBCTs. It doubles the target acquisition ranges over first generation systems and enables maximum range engagements with TOW missiles, significantly enhancing system lethality and Soldier survivability. Superior surveillance capability enables the Soldier to shape the battlefield by detecting targets at long range and either engaging with TOW missiles or directing the employment of other weapon systems to destroy those targets. A 90+ percent common derivative of ITAS is used in the ATGM variant of the Interim Armored Vehicle, part of the SBCT.

Program Status. ITAS is in FRP and is being fielded to AC and RC light infantry.

Guided MLRS (GMLRS) Rocket

Description. The GMLRS is the Army's primary precision strike, artillery rocket system. They replace the aging M26 unguided tactical rocket inventory, more than double the range out to more than 60 km and increase accuracy to near point-hit (less than 8 m GPS-aided) thus greatly reducing collateral damage and logistical resupply burden associated with unguided area munitions. GMLRS is launched

from HIMARS and M270A1 battalions that are organic and assigned to modular fires brigades and which provide integral fire support to joint early entry forces, SOF, and BCTs. GMLRS rockets fill the gap in range between direct-fire systems, short-range artillery systems, and longer range missile and air systems. GMLRS is a major upgrade to the M26 series rocket that integrates a guidance and control package and a new rocket motor.

The M30 Dual Purpose Improved Conventional Munition (DPICM) version of the GMLRS contains 404 submunitions (M101 grenades) to attack area targets. Fuze improvements, combined with the improved accuracy will also greatly reduce the hazard to operational maneuver and collateral damage from unexploded ordnance. A self-destruct fuze for the DPICM grenades is also being developed with European partners and will be incorporated into production. The XM31 GMLRS Unitary rocket variant will replace the DPICM submunitions payload with an approximate 200-pound, high-explosive (HE) unitary warhead, a multimode (point detonating, delay and proximity) fuze capability; and insensitive munitions (IM) rocket motor. This further reduces the collateral damage which enables the effects to be within danger-close proximity to friendly forces (within 200 m), as well as engaging targets in urban and complex environments with near point-hit accuracy (less than 8 m GPS-aided).

Typical threats to be engaged include self-propelled and towed artillery; multiple rocket launchers; forward-positioned, surface-to-surface missiles or enemy air defense; a wide variety of active and passive, soft or lightly armored vehicles; and area or point targets with no collateral damage constraints. The GMLRS Unitary rocket will provide the ability to attack critical area and point targets in restricted terrain (under foliage, urban environments, and heavy snow) that may require reduced collateral damage effects.

Program Status. GMLRS DPICM development is an international program with the United Kingdom, Germany, France and Italy. GMLRS DPICM began LRIP in FY03 and will achieve IOC in 2QFY06. GMLRS Unitary is currently a U.S.-only effort in SDD. An accelerated version of GMLRS-Unitary, with point detonate/delay fuze modes and the baseline, non-IM rocket motor, was fielded to the Multinational Corps-Iraq (MNC-I) and achieved IOC in Jul 05 within six months after Army G-3 validated the MNC-I Urgent Needs Statement (UNS). Hard targets were successfully engaged in Sep 05. The full GMLRS-Unitary capability with tri-mode fuze, trajectory shaping and IM compliant rocket motor will begin LRIP in FY07. Operational testing will be conducted in FY08 with IOC in late FY08.

120-mm XM395 Precision Guided Mortar Munition (PGMM)

Description. PGMM is a 120-mm, laser-guided, precision mortar munition designed to defeat high-payoff targets with low collateral damage. It is the maneuver task force commander's "hip pocket" indirect-fire, precision-effect munition, capable of providing responsive, standoff defeat of high-value targets. Current military operations have underscored the immediate and significant need for an organic, responsive, indirect-fire, extended-range, precision-strike munition that has significant capability against a variety of protected targets. PGMM is a multipurpose munition designed to defeat threat infantry protected by field fortifications, masonry walls, or lightly armored vehicles.

120-mm mortars, utilizing PGMM, are key organic lethality platforms for current and future combat forces. PGMM is the key lethality system for the close fight.

Program Status. PGMM transitioned into the SDD phase in 1QFY04, with production scheduled to begin in FY08 and fielding in FY10.

Excalibur

Description. Excalibur is a cannon-delivered, precision-guided, extended-range family of 155-mm artillery projectiles that self-guide to a programmed aim point using GPS. Excalibur will deliver better than 10-meter circular error probable accuracy from minimum (8 km) to maximum (35-40 km) range in all weather conditions. Anti-jam technology and an inertial navigation system are used to provide precision-strike capability in a GPS- jamming environment. Target and fuze data are programmed into the projectile via an inductive projectile programmer Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS). Excalibur uses an optimized (near-vertical) terminal trajectory to engage targets in urban and complex terrain with minimal collateral damage. Excalibur will overcome the limitations of current area engagement munitions with precision, increased range, lethality and minimal collateral damage.

Program Status. Excalibur provides improved fire support through a precision-guided, extended range, collateral damage-reducing, more lethal family of artillery projectiles. The Excalibur guided projectile program is using an incremental development approach to provide a combat capability to the Soldier as quickly as possible and to deliver advanced capabilities and lower costs as technology continues to mature. The initial block will contain a unitary high-explosive warhead effective against point targets as well as personnel targets such as dismounted infantry, weapon crews, and light materiel targets including air defense rockets, radars and wheeled vehicles. Future block improvements will include smart and discriminating munitions.

Precision Guidance Kit (PGK)

Description. PGK, formerly known as Course Correcting Fuze (CCF), is a program that will enhance the accuracy at mid to max ranges of all 155-mm and 105-mm artillery projectiles. The PGK program is using an incremental development approach. The requirement for the first increment is for less than 50 m circular error probable (CEP) for 155-mm, high-explosive projectiles; the requirement for the second increment is for less than 30 m CEP for 155-mm cargo and high explosive projectiles; and the requirement for the third increment is for less than 30 meters (threshold) and 10 meters (objective) CEP for all 155-mm and 105-mm projectiles. The Navy's Guidance Integrated Fuze (GIF) program is a PGK candidate and represents a cooperative Navy and Army effort to demonstrate, further develop and produce a fuze that will enhance the accuracy of the current artillery ammunition stockpile. GIF will use GPS guidance and small canards to apply minor corrections to the ballistic trajectory of artillery projectiles. The fuze will apply in-flight corrections to deliver the round to the target with much greater accuracy. In addition to the Army and Navy cooperative GIF program, the Army plans to make multiple (if required) six-month technology demonstration awards in a parallel effort. The Army strategy is to evaluate the PGK and GIF efforts and select the best candidate to enter SDD in FY07.

The Army anticipates beginning increment one production in FY08. The PGK program provides the commander a capability for increasing the accuracy of current conventional, area-based cannon artillery rounds at a lower cost than other precision munitions.

Program Status. The PGK program begins technical development in 2006.

Mid-Range Munition (MRM)

Description. MRM is an autonomous and laser-guided smart munition fired from an FCS Mounted Combat System (MCS) vehicle. This munition extends the maneuver commander's battlespace beyond-line-of-sight (BLOS) to more than 12 km. MRM exploits the ability of the FCS-equipped BCT to identify targets at greatly extended ranges, as well as pass digitized targeting information, in real time, to the maneuver commander or shooter. It also exploits autonomous and smart munitions technologies to provide a munition capable of being fired from a platform at extended range BLOS targets. There are currently two MRM round concepts being pursued, MRM-KE and MRM-CE.

MRM-KE is an advanced guided, boosted, kinetic energy (KE) anti-armor smart munition capable of defeating current and advanced armored threat vehicles from close in to extended BLOS ranges. It utilizes a kinetic energy rod and rocket motor technology to thrust the round towards the target at a very high speed for defeat. A millimeter-wave (MMW) autonomous seeker or SAL, along with radial maneuver thrusters, is used to acquire and guide the round towards the target with high accuracy. The projectile uses fins to aerodynamically induce spin and accelerometers to provide body motion data to ensure proper dynamics for seeker search area processing.

MRM-CE is an advanced, guided, chemical energy (CE) anti-armor smart munition capable of defeating current and advanced armored threat vehicles from fairly close in to extended BLOS ranges. It utilizes a dual tandem, chemical energy, shaped-charge warhead at relatively slow round impact speeds for target defeat. A dual-mode MMW, imaging infrared (IIR) autonomous seeker or SAL is used to acquire and guide towards the target with high accuracy. The sensors are mounted on a unique ball-joint gimbal to accomplish sensor imaging and large sensor search areas for target acquisition. The projectile uses canards and fins to stabilize the round and IMU technology to allow it to glide accurately towards the target during seeker search and terminal impact.

Program Status. MRM is currently an S&T (Tech Base) program. It is expected to obtain funding in the FY08-13 program plan and to enter SDD in FY08.

M117 Armored Security Vehicle (ASV)

Description. The ASV is a lightly armored all-wheel drive vehicle with 360-degree armor protection. The ASV has a crew of three plus one passenger, and vehicle intercom system

with CVC helmets. The armament suite consists of a MK19 GMG and a M2MG. It has a full collective NBC protection systems as well as a digitization package which includes FBCB2 (BFT) and SINCGARS radio.

The ASV provides minimum essential protection to combat support units in highly exposed threat environments. The primary vehicle requirement is for ballistic protection (wraparound and overhead) greater than the up-armored HMMWV. Increased lethality is provided through the availability of both point/area weapons (M45/MK19) in the same turret. The ability to reload under armor adds to the survivability of the crew. The ASV survivability and lethality increase the military police capability to conduct stability operations to include convoy escort; area and route reconnaissance and surveillance; counter-incursion reaction force roles; and security of critical assets, key personnel and lines of communication.

Program Status. Currently, 1,118 ASVs are funded and 169 ASVs have been fielded to the area of responsibility (AOR) and will continue until theater requirement of 872 ASVs is met in May 07.

Force Application Capabilities Summary

Stryker, FCS, HIMARS and the other materiel programs described in this appendix readily demonstrate the Army's modernization efforts to develop network-centric forces enabled by superior situational understanding and decision-making speed, capable of dominant maneuver and precision engagement (force application) as part of the joint team.

As the Army transforms to the future combat force design and capability, it will explore new and promising technologies that will provide enhanced force application capabilities. Inherent in this design is the requirement for all means of precision engagement to operate within a joint and combined system of systems and to be strategically responsive so that it remains an effective partner in the joint fight. This means that the Army must maximize commonality of organizations and equipment as well as fully leverage information technologies. Army transformation will meet these key requirements.

Appendix 2: Protection

Protection is the sum of all actions taken to prevent an adversary's effect on the Joint Force and the population that the Joint Force protects. These actions include protection of personnel, infrastructure and critical computer networks. Because WMDs pose a unique and catastrophic threat to personnel and infrastructure, special measures must be taken to deter and mitigate the effectiveness of an adversary's use of WMDs. These measures include WMD counterproliferation, nonproliferation before an attack, active defense measures during an attack, and our ability to conduct effective consequence management following an attack using WMDs.

Protection is accomplished through the planned and integrated application of several security-related and supporting operations and programs including law enforcement, physical security, protective services operations, critical infrastructure protection, information operations, crisis response, consequence management, intelligence and counterintelligence, intelligence fusion, counterterrorism and antiterrorism, and through air and missile defense (AMD) and chemical, biological, radiological, nuclear and high-yield explosive (CBRNE) defense measures.

The Army provides full-dimensional protection against enemy effects at the strategic,

operational and tactical levels to our homeland, allies and coalition partners, and the Joint Force. The protection of national or host nation assets and national centers of gravity is vital to the strategic level of operations from which national or combat power is generated.

The Army's priority of efforts in force protection remain focused on supporting operational forces and equipment deployed and in-transit; capitalizing on threat reporting and coordination with international/national intelligence and law enforcement agencies; enhancing detection and deterrence capabilities for CBRNE threats; institutionalizing installation access control for personnel and vehicles; improving policy and doctrine; strengthening training and exercises; and expanding force protection assessments.

The Army continues to ensure all mission essential systems are hardened to survive NBC effects, function in NBC environments, and are decontaminable. This will ensure that current and future combat forces are prepared to operate in NBC environments.

Physical security programs continue to focus on ensuring the adequacy of policy and programs, physical security technology initiatives, access control, and civilian police and guard initiatives necessary to ensure the security of individuals and property in support of worldwide Army operations. The Army is continuing to assess its critical infrastructure to ensure adequate protection against potential threat actions.

This appendix provides a brief discussion of Army protection capabilities, specifically, Army AMD and CBRNE defense capabilities and key materiel programs associated with these capabilities. The importance of space-based capabilities and their role in force protection is also described.

Air and Missile Defense (AMD) Capabilities

Army AMD Soldiers remain deployed worldwide in support of U.S. efforts in the global war on terrorism and defense of the homeland, while facilitating our transformation to a more expeditionary, joint, rapidly deployable and adaptive force. Patriot units are positioned in South Korea as a deterrence measure and sign of continuing U.S. commitment to that nation. AMD battalions man critical systems supporting operations in OIF and OEF. Air Defense and Airspace Management (ADAM) Cells are being fielded to and deployed with divisions and BCTs, including SBCTs. AMD units, weapon systems and integration platforms maintain constant defense of the National Capitol Region, are on call for special security events, and are viable enablers to the President and SECDEF's joint command and control network.

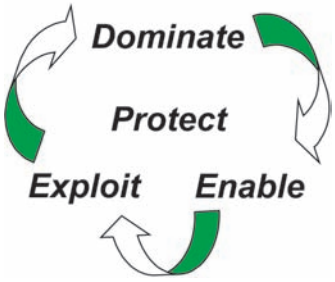
U.S. AMD transformation is fully aligned with ongoing and future DOD, Army and joint transformation policy. AMD units have been redesigned to meet the challenges of the future operational environment, the area-denial/anti-access strategies adversaries will employ, and the asymmetrical aerial capabilities adversaries will use against joint and coalition forces. AMD forces remain a ready and relevant member of the joint team at strategic, operational and tactical levels and possess the required capabilities to successfully execute all assigned warfighting missions. AMD is revising doctrine and training to fully support the Army's modular force conversion and provide the Combatant Commander with scalable, modular and tailorable force packages that possess joint and expeditionary capabilities. AMD is modernizing it's

capabilities along a joint AMD SoS approach that will also contribute to the attainment of Defense Transformation Planning Guidance operational goals. AMD transformation is consistent with and draws from Joint Operating Concepts, Joint Functional Concepts, and Joint Integrating Concepts. En route to the desired end state, Army AMD will continue to enhance the warfighting capabilities of the current force by pulling capabilities forward from the future force as technology and resources will allow.

AMD's Role in the Army

AMD forces—fighting interdependently with other elements of the JIM team at strategic, operational and tactical levels—will provide AMD and contribute to situational awareness/understanding, airspace management, and operational force protection to deter or defeat enemy aerial threats, protect the force and high-value assets, enable freedom to operate, and contribute to victory.

To accomplish this mission, transformed AMD forces must be able to dominate, enable, control and exploit the third dimension of the AOR.



Dominate. Army AMD will help dominate the third dimension interdependently with JIM forces, at strategic, operational and tactical levels, through joint attack operations; joint, layered active defense operations; joint passive defense measures; and integrated battle command. Modular, scalable, multifunctional Army AMD formations will be employed when and where required to deter and dissuade adversaries from using air and missile threats. Army AMD will help integrate and execute JIM offensive and defensive operations to deny enemy launch points and kill enemy air and missile threats on the ground before they can be launched. Mission-tailored AMD will also destroy enemy aerial RSTA beyond standoff, contributing to friendly force ability to see first by forcing the enemy to see last (or not at all). To preclude warheads or target debris from harming friendly forces or assets, Army AMD will proactively kill targets during midcourse and terminal phases of flight at sufficiently long ranges.

Enable. Army AMD will help enable the third dimension and contribute to information superiority by integrating its sensor and battle command elements into the joint distributed network and providing continuous surveillance information that will support the Single Integrated Air Picture (SIAP) portion of a three-dimensional COP. These AMD sensors and battle command elements will provide joint third-dimension situational awareness and understanding; provide Army linkage to the joint identification/engagement authorities; facilitate planning, coordination and synchronization of airspace activities and linkage to the Joint Airspace Control Authority (ACA); help enable trajectory clearance for ground-to-ground, ground-to-air and air-to-ground fires; and protect friendly aerial objects.

Control. Control is exercising, regulating, and governing the Army use of airspace in close coordination with the joint airspace control authority. Control assures discrimination of all airspace objects, virtually eliminating the risk of fratricide; enhances force protection for air and ground forces; and increases the overall effectiveness of the force.

Exploit. By dominating and enabling in the airspace, joint and coalition forces can better exploit it for their exclusive operational benefit. AMD and joint forces will exploit the third

dimension by using it to conduct inter- and intra-theater operational maneuver from strategic distances and to sustain noncontiguous forces via air. Modular, multifunctional AMD task forces will be deployable on C-130/future force airlift and will help enable the force to project and sustain in an anti-access environment by protecting critical bases of operation and protecting joint vertical entry forces. Army AMD ground and elevated sensors will provide extended range surveillance of aerial and ground targets that can be exploited to support offensive and defensive NLOS engagements. Army AMD elevated sensors will be multifunctional platforms providing long-endurance communications relays to distribute actionable information to enable commanders to effectively integrate, coordinate and synchronize warfighting operations with dispersed forces on the nonlinear battlefield. Army AMD and joint forces will leverage space and aerial ISR capabilities to support joint attack operations and provide early warning of air and missile attack to at-risk forces and civilian populations.

Modernizing our AMD System of Systems (SoS) in the Context of Transformation

A relevant and ready AMD SoS capability is crucial to supporting our National Security Strategy. As AMD units use specific systems to dominate, enable, control or exploit they do so with varied strengths and weaknesses. Transforming AMD as an SoS facilitates the Joint Force commander's ability to employ capabilities in mutually beneficial ways that capitalize on strengths and offset weaknesses to optimize AMD affects. The necessity of an AMD SoS is further underpinned by complex global considerations, which influence operational focus against threats that can rapidly deliver WMDs against the homeland and from outside a Joint Force commander's AOR. Army AMD SoS will require an unprecedented degree of offensive/defensive operations and capability integration within and among Joint Force commands. This integration will enable Active AMD to provide a layered defense with multiple engagement opportunities against threats.

The regional fight may be constrained by limited assets due to strategic imperatives, short warning times for deployment, limited lift and immature AORs. The Joint Force will mitigate these challenges through offensive/defensive JIM integration with AMD integration platforms.

Joint, integrated AMD is a critical warfighting requirement that protects our homeland, deployed forces, friends and allies. This capability is achieved through an effective SoS application and synergy consisting of sensors, shooters and battle managers. Integrated battle command provides the AMD SoS backbone. Without the ability to provide fused, near real-time information with fire control quality data, Army AMD SoS will not be able to provide such key AMD capabilities as BLOS or wide-area engagements. There are no battle command systems that can provide fire control quality data throughout the SoS. Development of a SIAP or integrated fire control capability evolution may eventually provide a single battle command solution among the Services and the Joint Force, but that capability has not yet been developed, planned or programmed.

The Army AMD SoS is designed to offset the problems related to Service-specific systems—limited interoperability or joint functionality, limited capability to maximize engagements out to kinematic ranges, lack of a fused air picture, no persistent wide-area detection capability and limited engagement

battlespace due to the range and terrain limitations of single systems.

The Army AMD SoS program is synchronized with other Services and in many aspects is leading the way to develop a Joint Force AMD SoS to counter ballistic missiles, cruise missiles (CMs), UAVs, tactical air-to-surface missiles, rockets, artillery and mortars, and rotary/fixed-wing aircraft threats.

As the Army AMD SoS matures, the traditional system-centric paradigm that has driven AMD DOTMLPF is experiencing a corresponding evolution. The AMD force will continue to possess specific systems (e.g., Patriot), which comprise shooters, sensors, and battle managers. However, our pursuit of SoS has given rise to a conceptual construct of shooters, sensors, and battle managers that will profoundly affect how Army DOTMLPF supports AMD. In this context, specific systems become more transparent and less stovepiped. A mature AMD SoS will ultimately possess a common battle manager that will be supported by plug-and-fight shooters and sensors. Our AMD units will be supported by Soldiers who will be proficient in operating and maintaining a common battle manager, and a suite of shooters and sensors.

Already, Army AMD is changing the way it organizes and fights with the development of composite AMD units that are modular, multifunctional and more readily provide the full spectrum of AMD combat potential. These units more efficiently offset the limitations of a single system, significantly increase the effectiveness of the area air defense commander's defense design, enhance modular or task force operations, reduce the limitations created by autonomous operations and conditions that have led to past fratricide, and increase the engagement battlespace against all AMD threats.

The AMD organizational vision is fully embedded with the modular Army future force vision. All forces are considered pooled and available to support any future JIM headquarters with mission-tailored packages. Army AMD transformation will optimize the synergy between AC and RC forces to meet the requirements inherent in homeland security, strategic deterrence, stability operations and major combat operations Joint Operating Concepts.

Unit transformation begins with battalions but stretches across all AMD echelons. Five composite AMD battalions will each comprise four Patriot batteries and one Avenger battery by 3QFY06. In the future, our composite AMD units will evolve into a combination that includes Surface-Launched Advanced and Medium Range Air-to-Air Missile (SLAM-RAAM) and, in some cases, the Terminal High Altitude Area Defense (THAAD) units. AMD batteries or battery teams will be the primary battle elements to achieve effects on the battlefield from tactical to strategic levels. They can rapidly deploy, achieve one or more required lethal effects without augmentation, and sustain unit operations. They can fight independently but generally will serve as subordinate, multifunctional AMD task force elements. All AMD combat units will be pooled at the corps-level under AMD brigades for rapid integration into corps or division formations, in support of BCTs, as the operational/threat environment requires.

Army Air and Missile Defense Command (AAMDC) is the senior Army AMD battle command headquarters at the corps level, and commands AMD forces (brigades) assigned to operate at that level. AAMDC has, in concert with the Joint Force's area air defense commander, overall mission responsibility for the planning, integration and execution of Army air and missile defense operations. AAMDCs are regionally focused headquarters. The two

AC AAMDCs conduct frequent, short-notice deployments in support of U. S. Pacific Command (USPACOM) and USCENTCOM. The RC AAMDC is focused on defense of CONUS in support of U.S. Northern Command (USNORTHCOM) and complements the regionally focused headquarters in the other geographic Combatant Commanders' AORs. THAAD and JLENS systems, along with their supporting command and maintenance units, will be assigned to regionally focused AMD brigades.

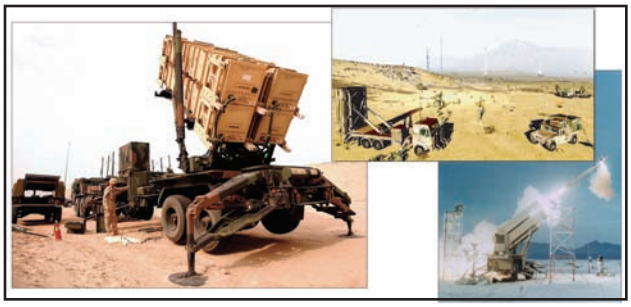
Army AMD transformation, comprising SoS modernization efforts, supports joint interdependence by providing the Joint Force its only current capability against short-range ballistic missiles—the first integrated capability against advanced CMs—and by reducing focus on areas well covered by the Joint Force, such as defeating the fixed-wing threat. Army AMD continues to be an essential element of Joint Force operations and provides the right capabilities for joint and Army future force success.

Discussion of Key AMD Materiel Programs

Army modernization for AMD provides key components and capabilities of the joint AMD SoS. As aerial threats possess diverse profiles and varied target characteristics, Army modernization will provide systems capable of defeating a wide range of aerial threats from advanced CMs to tactical ballistic missiles.

Patriot/Medium Extended Air Defense System (MEADS) Combined Aggregate Program (CAP)

Description. Within the current force, Patriot is an echelon above corps (EAC) AMD system that can simultaneously engage and destroy multiple air and missile threats at varying



ranges and altitudes. It is the world's only battle-proven theater AMD system and will be a key AMD element for the next 20 years. During this period, Patriot will provide Combatant Commanders with modular, scalable, mission-tailored capabilities to dominate, enable and exploit the third-dimension battlespace and contribute to operational force protection in support of the joint team.

With the approval of the Defense Acquisition Executive (DAE), the Army has combined the management, development and fielding of the Patriot and MEADS programs. The Patriot/MEADS CAP is an integral element in the DOD Ballistic Missile Defense System (BMDS) and is based on the concept that the MEADS objective capability will be achieved through an evolutionary approach by incrementally inserting MEADS major end items (MEIs) into the current Patriot system, thereby providing increased capability to the field in a more timely manner. This approach allows for earlier modernization and fielding of enhanced capabilities to current Patriot forces in conjunction with recapitalization efforts.

In FY06, the Patriot force will complete reorganization in accordance with the Army G-3/5/7-approved January 2005 Force Design Update (FDU), which implements a force structure of 13 Patriot-based battalions consisting of four battery battalions. Of these thirteen battalions, five will be composite AMD battalions (PAC-3 and Avenger), and eight will be pure Patriot battalions (five PAC-3 battalions and three PAC-2 battalions). While the

ARNG will no longer possess Patriot force structure, the Compo I Patriot force will grow from 50 to 52 batteries/fire units in FY06. Currently, only 40 of the 52 AC Patriot batteries are funded for upgrades to PAC-3, allowing for a mixed force of battalions with significantly different capabilities. PAC-3 provides a remote-launch capability, which significantly extends the defended area; increases range, altitude and firepower with the PAC-3, hit-to-kill, missile and ground support equipment; and engages multiple TBM, CM and UAV threats. PAC-3 system upgrades are planned to counter evolving threats, improve joint interoperability, and increase surveillance and detection capabilities required as part of an evolutionary development. Further, to support current operations, congressional committees have resourced nine capability upgrades that will be fielded to Patriot units in FY05-07 to remedy deficiencies identified in OIF lessons learned. These remedies include upgraded air-to-ground communications, improved software affecting classification, identification friend or foe (IFF) enhancements, Link-16 joint range extension, embedded data recorder replacement, radar shroud monitor, battery command post (BCP) acceleration, upgrades to AMD training centers, and software-driven improvements in training scenarios to address spurious tracks and track correlation.

The Patriot recapitalization program improves operational capability by bringing existing Patriot assets to a like-new (zero-miles/zero-hours) state, thereby achieving OSD's Setting the Force objectives and enabling the Army to meet future Combatant Commander requirements. However, beginning in FY07, the Patriot recapitalization program will be significantly reduced from a recapitalization of 85 MEIs per year to four MEIs per year. In the context of the Army's transformation to the future combat force, this divestment strategy accentuates the importance of the well-timed fielding of future force capabilities, such as MEADs.

MEADS will provide joint and coalition forces critical asset and defended area protection against multiple and simultaneous attacks by short- to medium-range ballistic missiles, CMs, UAVs and tactical air-to-surface missiles (TASMs). MEADS will have a netted and distributed architecture with modular components to increase survivability and flexibility of employment in a number of operational configurations. The objective MEADS fire unit/battery will be scalable and tailorable to operational requirements. MEADS implements the plug-and-fight capability to support flexible interoperability in support of AMD task force requirements. It comprises a battle manager capable of integrating into Army and Joint SoS battle command architectures using Link-16 and wideband networking capabilities to provide maximum protection of supported forces by engaging at longer ranges with distributed system operations and BLOS engagements. The MEADS fire unit/battery features a near-vertical launcher capable of launching up to 12 missiles; a missile reloader; the PAC-3 Cost Reduction Initiative (CRI) missile; an ultra-high frequency (UHF) surveillance radar (SR), providing 360-degree coverage and near-range to long-range detection of multiple low-radar, cross-section targets; and two X-band Multifunction Fire Control Radars (MFCR) that provide 360-degree coverage and are designed for high-precision handover to the in-flight missile, discrimination capabilities, and short-range target detection and horizon search.

In addition, MEADS will provide significant improvements in strategic deployability, transportability, mobility and maneuverability. Its substantially reduced lift requirements enable MEADS to be deployed rapidly with essential combat loads via inter-/intra-theater land, sea

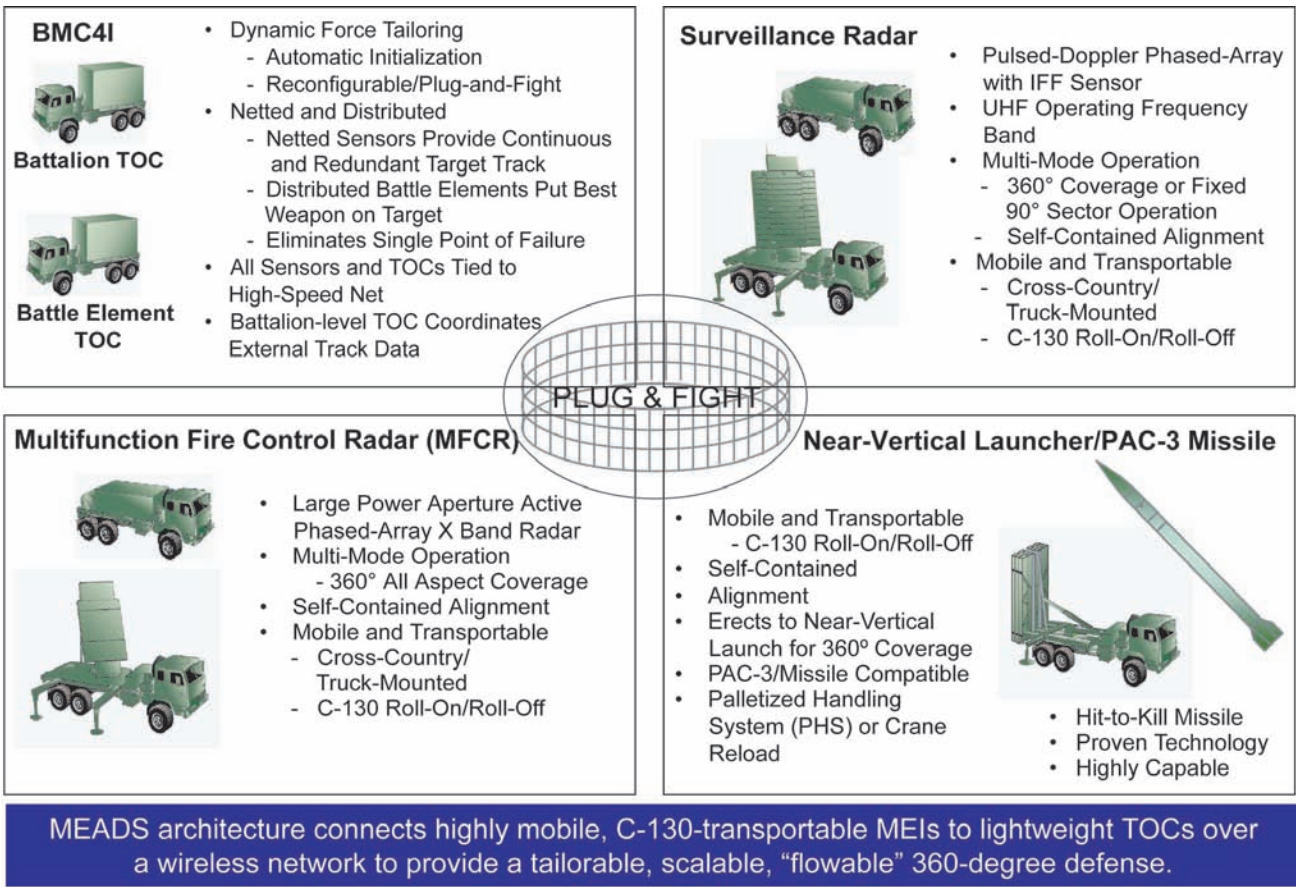


Figure D-7. MEADS Key System Elements

and airlift anywhere in the world. MEADS will provide Combatant Commanders with an AMD system that is fully transportable by C-130 aircraft, thus increasing strategic and tactical mobility. Further, its decreased size and weight and ability to conduct rapid march order and system emplacement will enhance maneuverability, thereby providing better AMD protection to maneuvering forces.

While the PAC-3 CRI missile is the baseline missile for MEADS, the Missile Segment Enhancement (MSE) missile is being developed to meet U.S. operational requirements. MSE will provide a more agile and lethal interceptor that increases the engagement envelope/ defended area of the Patriot system and MEADS. The MSE improves upon the current PAC-3 missile capability with a higher performance solid rocket motor, modified lethality enhancer, more responsive control surfaces, upgraded guidance software, and insensitive munitions improvements. At the completion of the development effort, the change to the missile will be incorporated into production currently planned for FY10. MSE will significantly contribute to increasing MEADS capability to "defend" as part of the Protection Joint Functional Concept construct.

The CAP increments will improve the current Patriot capability to protect forces during the transformation to MEADS. MEADS MEIs will be developed and fielded in three acquisition increments that comply with, and are in support of, integrated AMD and Joint SoS capabilities:

CAP Acquisition Increment 1 (FY09). The first CAP increment will rehost the current

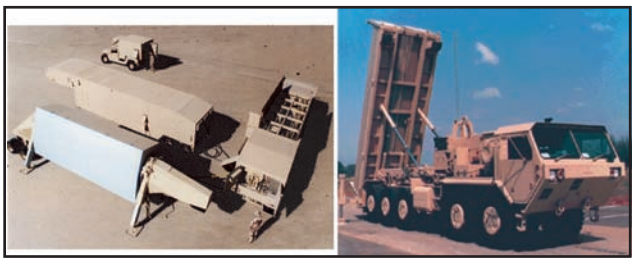
battle command capability resident on the Patriot system on new prime movers to gain C-130 transportability and add a capability enhancement that enables BLOS engagements for SLAMRAAM using Patriot or JLENS (elevated sensor) fire control data. The CAP Increment 1 BMC4I begins initial production in FY08 and serves as the basis for further incremental development.

CAP Acquisition Increment 2 (FY11). The Increment 2 architecture will integrate the MEADS launcher and initial battle command capability into Patriot. It includes the MSE missile in a single-canister configuration, the MEADS near-vertical launcher with the Patriot reloader and MEADS plug-and-fight and battle command software packages to support integrated fire control. These components, when integrated into the SoS architecture with JLENS, will significantly increase the defended area by enabling engage-on-remote (EOR) capability against incoming threats. EOR capability will enable units to take advantage of the significant improvements of the MSE missile, providing increased protection to tactical formations and defended assets. The CAP Increment 2 capability begins initial production in FY11 as Patriot transforms to MEADS.

CAP Acquisition Increment 3 (FY15). The CAP Increment 3 architecture will integrate the objective MEADS configuration into the AMD task force. Updated battle management capabilities will include a communications backbone and software functionality that fully implements AMD task force plug-and-fight capability to enable rapid transition of elements within the force to support tactical mobility requirements. The CAP Increment 3 integrates the new SR and two MFCRs into the fire unit/battery for full 360-degree coverage while maneuvering with the protected force. The associated MEADS surveillance, fire control, classification discrimination and identification (CDI) and battle management functionality will offset current operational Patriot shortfalls/capability gaps in the areas of sectored systems, stressing threats, strategic and tactical mobility and CID. Enhancements in CID will significantly contribute to fratricide prevention by incorporating the capability to noncooperatively classify targets by type and specific platform, thereby contributing to the identification of unknown targets that may have nonfunctional IFF transponders.

Program Status. Within the CAP, there are two synergistic efforts: an international MEADS development effort (United States, Germany and Italy) managed by the North Atlantic Treaty Organization (NATO) MEADS Management Agency (NAMEADSMA), and a U.S. effort to inject U.S.-specific capability requirements into the MEADS MEIs. The Army's plan for the combined management, development and fielding of the Patriot and MEADS programs was approved by the DAE at the Defense Acquisition Board (DAB) on 7 Apr 03. On 1 Jul 04, the DAB-approved Milestone B for all three CAP increments, with a FUE date in 2015 (battery-level). NAMEADSMA, the NATO contracting authority, awarded a $3.4 billion design and development contract to MEADS International on 31 May 05.

Terminal High Altitude Area Defense (THAAD)



Description. THAAD is a ground-based missile defense system being developed

to protect forward-deployed military forces, population centers and civilian assets from short-, medium-, and intermediate-range ballistic missiles. As an element of the Missile Defense Agency's (MDA) terminal defense segment, THAAD will provide the opportunity to engage ballistic missiles—outside or inside the earth's atmosphere—that were not destroyed earlier in the boost phase or midcourse phases of flight by other BMDS elements, such as Aegis or the Ground-Based Midcourse Defense System Interceptor.

A THAAD unit consists of a command and control/battle management component, truck-mounted launchers, interceptors, an X-band radar and ground support equipment. The THAAD interceptor is comprised of a single-stage booster and a kinetic kill vehicle, which destroys enemy warheads through hit-to-kill collisions. The THAAD radar is a solid-state, phased-array, X-band radar that performs search, track, discrimination and other fire control functions. The THAAD radar also sends updated target information to the kill vehicle while in flight.

Program Status. MDA is developing THAAD in incremental, capabilities-based blocks. Flight tests scheduled to begin in FY06 are part of an extensive T&E program that will demonstrate the capability of the ongoing research and development activities. The THAAD acquisition strategy will rely on test program results to make future acquisition and Army transition decisions. The first THAAD fire unit will begin fielding in FY09 with a second in FY10.

Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM)

Description. SLAMRAAM will defend designated critical assets and maneuver forces against aerial threats. It is a key component

of the AMD composite battalion, will replace the Avenger in the Army's AMD force and is being developed in concert with the USMC's Complementary Low-Altitude Weapons System (CLAWS). SLAMRAAM is a lightweight, day-or-night, adverse-weather, NLOS system for countering CMs, UAVs, RSTA platforms, and rotary and fixed-wing threats with engagement capabilities in excess of 18 km. The system has an Integrated Fire Control Shelter (IFCS) to command and control its sensor and launchers. While SLAMRAAM uses its own Sentinel Enhanced Target Range Acquisition Classification (ETRAC) to provide surveillance and fire control data, the system will receive data from other joint and Army external sensors when available. SLAMRAAM's launcher is a HMMWV-mounted platform with common joint launch rails, launcher electronics, onboard C4 components, and four AIM-120 Advanced Medium-Range Air-to-Air Missiles (AMRAAMs).

Program Status. The SLAMRAAM entered the SDD phase in Sep 03. It is funded for development and fielding of one battery in FY08 and one battalion in FY10.

Ground-Based Midcourse Defense (GMD)

Description. GMD is a fixed-site, land-based system designed to provide limited protection to the United States against an intercontinental ballistic missile (ICBM) attack. The GMD

design focuses on ensuring high defense effectiveness against ballistic missile attacks of limited scope (e.g., accidental, unauthorized, or authorized limited launch). The GMD SoS architecture comprises the following components: GMD Communications Network (GCN), GMD Fire Control (GFC), Missile In-Flight Communications, and Ground-Based Interceptors (GBI). GMD is part of a SoS architecture that includes Upgraded Early Warning Radars (UEWR), Forward-Based X-Band–Transportable (FBX-T) radars, Aegis Ballistic Missile Defense (BMD), Sea-Based X-Band (SBX) radar, the Space-Based Infrared System (SBIRS) and its Defense Support Program (DSP) predecessor.

Program Status. GMD, as an element of the MDA's broader BMDS, is a capabilities-based developmental acquisition program utilizing a block approach. The Army has served as lead Service for GMD (less acquisition) since 1999, and today has focused its efforts on providing installation support, facilities, resources, force protection and operational personnel in support of the deployment of a capability for limited defensive operations in 2004 with an additional mission as a developmental test bed. The Strategic Planning Guidance directs the MDA to develop options for expanding GMD beyond the test bed.

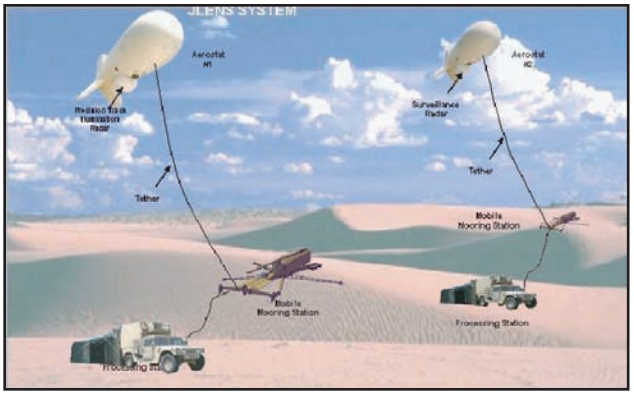
Counter-Rocket, Artillery and Mortar (C-RAM)

Program Description. C-RAM is a holistic, multi-Service approach for providing integrated, modular and scaleable capability to counter rocket, artillery and mortar attacks against friendly forces and assets while minimizing collateral damage or posing a threat to friendly/neutral aircraft. The C-RAM initiative is built upon seven functional areas: shape, sense, warn, intercept, respond, protect and C2 to provide the current force with near-term and midterm protection against rockets, artillery and mortars (RAM). Several agencies within the Army are an integral part of the Joint C-RAM solution including the TRADOC Futures Center, Air and Missile Defense Battle Lab (AMDBL), other TRADOC schools and the Maneuver Support Center, the Counterstrike Task Force at Fort Sill, the Engineer Research and Development Center, the Rapid Equipping Force, and various material developers.

Program Status. An operational need to protect friendly forces against indirect fire attacks in support of the global war on terrorism has served as a catalyst for heightened interest in C-RAM development. In May 04, TRADOC began an effort to spirally develop and deploy an integrated set of capabilities to defeat RAM threats. Subsequently, the Joint IED Defeat Task Force sponsored a Joint C-RAM initiative. A future Army program will be the result of this initiative. Already, the Army has deployed an initial sense, warn and intercept capability through a system of systems using Land-based Phalanx Weapon Systems (LPWS), Forward Area Air Defense-Command and Control (FAAD-C2), Lightweight Counter Mortar Radars (LCMR), Firefinder Radars, Sentinel Radars, Wireless Audio Visual Emergency System (WAVES), Rapid Aerostat Initial Deployment (RAID),

and Air and Missile Defense Workstations (AMDWS). The deployment of more robust shape, sense, warn, intercept and respond capabilities is planned for future spirals. Future spiral capabilities are improved kinetic energy and potentially directed energy solutions to support the intercept functional area; and integrated base defense security through integrated sensor suites, information sharing, and improved battle command to support the shape, response and C2 functional areas.

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS)



Description. JLENS, an Army-led joint-interest program, is an elevated, long-endurance system that uses advanced sensor and networking technologies to provide 360-degree Wide-Area Surveillance Radar and Precision Track Illumination Radar (PTIR) against the land attack cruise missiles (LACMs) threat and can also serve as a long-endurance communications relay. JLENS enables joint and Army AMD SoS to conduct BLOS and NLOS engagements against aerial targets out to each respective interceptor's maximum effective kinematic range and to enable engagements in clutter. JLENS provides detection and tracking of fixed- and rotary-wing aircraft, UAVs, TBMs in boost phase, and surface moving objects when performing a selective moving target indicator (SMTI) mission. JLENS directly supports all facets of Joint Theater AMD (JTAMD) active air defense and contributes to offensive counter air (OCA)/attack operations and C4I through multi-link dynamic data distribution. JLENS supports JTAMD mission set execution by providing surveillance and supporting integrated fire control (IFC), and aerial CID activities. JLENS is a major contributor to the JTAMD Capstone Requirements Document (CRD) objectives of SIAP and CID, providing precision tracking and measurement information. As a key element of the SIAP, JLENS correlates organic tracks/measurements with IFF and precise participant location identification (PPLI) data. The correlated data is then placed on the external networks. JLENS is less expensive to buy and operate than fixed-wing aircraft and can stay aloft for up to 30 days, providing 24-hour battlespace coverage over extended areas.

Program Status. JLENS is a key component of the Army's cruise missile defense (CMD) acceleration initiative, developed as a joint solution in a SoS framework, to provide Combatant Commanders with an increased CMD contingency capability by FY08, with FUE in FY11. JLENS is being developed, demonstrated and procured using an evolutionary acquisition strategy consisting of spirals and increments that lead to the fulfillment of ORD requirements. Block 1 consists of two spirals, with spiral 2 meeting Block 1 requirements. Each spiral is being constructed to support air-directed, surface-to-air missile (ADSAM) engagements, SIAP and CID capabilities. Block 2 will provide increased fire control and wide area surveillance capability with each sensor hosted on a nontethered platform. Block 3 provides an increased system capability with sensors hosted on a single nontethered platform for high mobility. JLENS was approved for Milestone B in FY05 as an ACAT 1D program. It is scheduled for a Milestone C decision in FY10.

Rapid Aerostat Initial Deployment (RAID)

Description. RAID is a fielded force protection sensor on an elevated platform (aerostat or tower) that provides 24/7, 360-degree, high-resolution visual coverage for forward operating bases in a theater of operations. This electro-optical (EO) infrared (IR) sensor provides early-warning and targeting data to combat IEDs, mortar, rocket-propelled grenade and small-arms attacks. The sensor consists of a day/night sight, laser range finder and spotting scope capable of detection ranges of 13 km for personnel and 20 km for vehicles. In Dec 02, the VCSA tasked Army materiel developers, in coordination with the REF, to determine what materiel solutions could be made rapidly available to improve force protection for Soldiers in Afghanistan and elsewhere. In response to the VCSA initiative, the JLENS project office proposed, developed and deployed three force protection packages known as JLENS RAID to Afghanistan in support of OEF in Mar 03 for $6.1 million. These elevated, multispectral sensor systems were fully operational by early Apr 03.

The JLENS RAID system consists of three main components:

Platform. AB-1309, 117-foot tower or 15-m aerostat.

Sensor. Provides 24/7, 360-degree visual coverage with an EO color daytime camera, an infrared black/white day or night camera, and a laser range finder with pointing azimuth indicator for precisely locating targets of interest out to 13 km (personnel) or 20 km (vehicles), allowing the commander in the field to respond in a timely, safe and appropriate manner.

Ground Control Station. For sensor display and control with video recording/playback capability EO/IR fully passive sensor system, color EO daytime and black/white IR day or night capability with laser range finder, and pointing azimuth indicator.

Program Status. The Army, through the FY05 Supplemental, funded 39 systems for the operational theater. This will bring the total systems in theater to 59.

Sentinel

Description. The Sentinel radar employs a modern, phased-array antenna that automatically detects, tracks, classifies and identifies CMs, UAVs, helicopters and fixed-wing aircraft to cue maneuver AMD battalions (MAMD) weapon systems. The Sentinel is comprised of a radar-based sensor system with its HMMWV prime mover, power, IFF, and command and control interfaces. The

antenna/transceiver group has an advanced third-dimensional battlefield air defense radar housed aboard a light tactical trailer chassis. Targets can be hovering or fast moving, from nap of the earth to the maximum engagement altitude of MAMD weapon systems. The radar operates in the X-band, transmitting 1,100 pencil beams per rotation. It rotates at 30 rpm (two-second update). Sentinel, with the ETRAC, improves operations in a joint environment to detect smaller cross-section targets and is critical for airspace SA/SU, deconfliction and advanced threat early warning. ETRAC upgrades add 20 rpm (three-second update) rotation and staring capability to enhance the detection and tracking of CMs. The instrumented range and altitude are 40 km and 4 km, respectively. The Sentinel utilizes the SINCGARS, AN/VRC-92A, EPLRS and AN/VSQ-2 radios. These radios can provide a track file of more than 60 targets. Sensor data is passed through the FAAD-C2 system to MAMD weapon systems. Sentinels will be organic to the AMD composite and the Avenger/SLAMRAAM (pure) battalions, providing 360-degree surveillance to counter CMs, UAVs and other air-breathing threats (ABTs), enabling Avenger today and SLAMRAAM in the future to defeat those threats.

Program Status. The program completed its primary Sentinel procurement in FY01 and is currently undergoing P3I to improve surveillance and tracking capabilities. Sentinel completed fielding to AC and ARNG units in FY03. Additional upgrades and system modifications are currently scheduled through FY11 for many AC and RC units to improve target identification, increase joint combat ID capabilities, and reduce the potential for fratricide. ETRAC modifications will be applied to 74 radars by FY11. The ETRAC modifications consist of two upgrades: Phase 1A improves the radar detection range against low-observable and stealthy targets; Phase 1B improves the radar classification of low-observable and stealthy targets at extended ranges. The Phase 1B capability for target airframe classification will support the joint identification and target classification function that allows short-range weapons to operate at maximum effectiveness.

Air and Missile Defense Planning and Control System (AMDPCS)

Description. The AMDPCS integrates AMD operations for ADA brigades, the Army Air and Missile Defense Command (AAMDC) headquarters, joint command and control elements, and ADAM Cells. AMDPCS enables air defense/engagement operations through two major systems: the AMDWS is a missile defense staff planning and battlespace situational awareness tool that provides commanders at all echelons with a common tactical and operational air picture and enables Army interoperability with joint theater AMD forces; the Air Defense System Integrator (ADSI) facilitates situational awareness and understanding for air battle engagement operations. AMDPCS automates C4ISR digital linkages; integrates AMD sensors, weapons and C3I systems; and interfaces with the Army Battle Command System (ABCS), Global Command and Control System (GCCS), and joint and allied battle management systems. AMDPCS is the foundation for the ADAM Cell and a critical component of the maneuver commander's ability to execute effective Army airspace command and control (A2C2).

Program Status. AMDPCS is an ACAT III program with a May 97-approved ORD currently under revision. The FY06-11 program plan funds AMDPCS to complete the IOC of the 94th AAMDC, and upgrade the 32nd AAMDC and the 6th ADA Brigade. AMDPCS program funding will stand up the ARNG

164th ADA Brigade and field 92 ADAM Cells to the Army Modular Force.

Forward Area Air Defense–Command and Control (FAAD-C2)

Description. The FAAD-C2 system digitally processes and disseminates real-time target cueing and tracking information, the common tactical air picture, and command, control and intelligence information to MAMD weapon systems. The FAAD-C2 consists of the FAAD engagement operations workstations (EOWS) that provides alerting data to air defense gunners, airspace battle management, and enhances force protection against air and missile attacks. Situational awareness and targeting data is provided on threat aircraft, CMs and UAVs. The FAAD-C2 system enables engagement operations through the integration with the Multifunctional Information Distribution System (MIDS), the Joint Tactical Terminal (JTT), Single Channel Ground and Airborne Radio System (SINCGARS), Enhanced Position Location System (EPLRS), Global Positioning System (GPS), the Airborne Warning and Control Systems (AWACS), the Sentinel radar, and the ABCS architecture. FAAD-C2 is a critical component of the ADAM Cell which enables the maneuver commander's ability to execute effective A2C2.

Program Status. FAAD-C2 is an ACAT II program with an Aug 95 approved ORD. The FY06-11 program plan funds FAAD-C2 fielding to the ARNG (1-174th ADA Battalion, 2-174th ADA Battalion and 1-265th ADA Battalion). FAAD-C2 program funding will provide FAAD EOWS in 92 ADAM Cells.

Air Defense and Airspace Management (ADAM) Cell

Description. The ADAM system provides the maneuver commander with a modular, scalable cell consisting of air defense and aviation personnel/equipment, that is capable of providing airspace management, planning and coordination utilizing third-dimensional situational awareness/understanding obtained from sensors in theater and joint/allied data exchange via the Joint Data Network (JDN). The ADAM Cell is organic at corps, divisions, BCTs, SBCTs and fires brigades and is equipped with AMDPCS and FAAD-C2 systems manned by air defense personnel. AMDPCS includes an AMDWS and an ADSI. FAAD-C2 includes an FAAD EOWS with an intelligence processor. Additionally, the ADAM Cell is equipped with the Tactical Airspace Integration System (TAIS) Airspace Workstation (AWS), and at the SBCT it includes an Aviation Mission Planning Workstation (AMP), both manned by aviation personnel. ADAM Cells will conduct AMD planning and coordination and maintain aerial situational awareness proportionate with the service sensors deployed within the area of operations; provide the commander and staff with the aerial component of the overall common tactical and operational air picture; work with the maneuver units staff to realize the commander's intent with respect to aerial situational awareness and defenses; and monitor the AMD situation while conducting mission, enemy, terrain and weather, time, troops available and civilian (METT-TC) analysis to achieve friendly and enemy third-dimensional situational awareness/understanding.

Program Status. ADAM Cells will be funded through the AMDPCS program element primarily through supplementals and adjustments to the normal programming. Current funding will provide 135 ADAM Cells to meet

the Army modular force MTOE authorizations. ADAM Cells will be assigned one per corps and six per division. Within the division, an ADAM Cell will be located in both tactical command posts and in each of the four BCTs. Additionally, one each ADAM Cell is authorized in the fires brigades. Consideration is being given to ADAM Cells for each modular combat aviation brigade, combat support brigade, and battlefield surveillance brigade. To date, the Army has fielded 20 ADAM Cells and will field an additional 22 in FY06.

Joint Tactical Ground Station (JTAGS) Multi-Mission Mobile Processor (M3P)

Description. The M3P is a P3I of the current, operationally proven JTAGS system. JTAGS M3P is being acquired as part of the mobile ground segment for the Space-Based Infrared System (SBIRS), the successor to the DSP. JTAGS M3P is a transportable missile warning and communications system that receives and processes direct downlink raw data from DSP and SBIRS sensors. The capability supports simultaneous operations in multiple theaters and provides the theater Combatant Commander with organic in-theater tactical ballistic missile threat warning. In addition, the JTAGS M3P with the SBIRS sensors will provide battlespace characterization data for situational awareness. JTAGS M3P will interface with DCGS-A to provide warning and situational awareness data down to the tactical command level. The JTAGS M3P data processor and communications equipment are contained in a 42-foot van and includes two 100-kW generators, three 5-ton cargo trucks, one 5-ton tractor, three tri-band antennas and one HMMWV. The JTAGS program has incorporated a block acquisition approach to upgrade the M3P configuration and meet objective performance requirements. This approach secures an evolving and increasing capability to access the similarly evolving data provided by DSP sensors as the SBIRS constellation replaces the aging DSP inventory. Block 1 maintains supportability and DSP compatibility by applying selected upgrades to the current JTAGS.

Program Status. The Army plans to replace the five fielded JTAGS with the M3P systems, of which three sections are permanently forward deployed, beginning in FY11-12. The Joint Requirement Oversight Council (JROC)-approved requirement calls for a JTAGS M3P force of three full detachments (six sections total). The sixth section is currently not funded. The transition to Block 2 is expected to occur as the SBIRS High Earth Orbit (HEO) and Geosynchronous (GEO) satellites are launched and assume operational capability. With the SBIRS program recertification/replanning underway, the Block 2 baseline program has not been approved. M3P Block 3 is planned to incorporate data from the technologies developed by the MDA and their development efforts with the Space Tracking and Surveillance System (formally SBIRS Low). MDA is conducting technology demonstrations that will lead to a Low Earth Orbit (LEO) constellation that will support the Ballistic Missile Defense System and strategic and tactical missile warning.

AMD Summary

AMD future combat force organizations and systems reflect the culmination of ongoing system improvements, new system capabilities and state-of-the-art technologies. They will be modular, highly mobile, tailorable and interoperable with Army, joint and multinational forces and interagency team members. They will be fully capable of proactively protecting joint forces, providing aerial situational awareness, and contributing to airspace management across the range of military operations. The future force AMD SoS development and subsequent resourcing challenges the Army to pursue and analyze technologies that support valid operational concepts and doctrine. This ongoing analysis will ensure the Army funds effective DOTMLPF solutions that optimize capabilities for the future force.

Space Capabilities Enabling Force Protection

In addition to AMD and CBRNE capabilities supporting force protection, military dependence on such space force enhancement capabilities as position, velocity, navigation, timing services, ISR, communications and weather, terrain, and environmental monitoring (WETM) data continues to grow. Space control is an evolving facet of force protection that helps assure access to these capabilities while denying adversaries the same, thus facilitating freedom of action for maneuver forces and space assets. It involves four interrelated objectives:

- Surveillance of space assets to understand their mission and operations as well as threat characterization and rules of engagement (ROE) validation
- Protection (defensive or offensive) of space systems from hostile actions
- Prevention (active or passive) of unauthorized access to and exploitation of space systems
- Negation (deny, disrupt, deceive, degrade or destroy ground or space assets or communications links between them) of hostile space systems that place the Combatant Commander's interests at risk

Our ever-increasing reliance on space, combined with the advantages an adversary can garner from both foreign government and commercial space capabilities, makes space control a long-term operational priority.

The Army contributes to the nation's space control capability through use of the ground-based space surveillance systems on Kwajalein Atoll. When not committed to Ballistic Missile Defense research and development, these radars help the U.S. Strategic Command identify and characterize potential adversary space capabilities. Tactical surveillance capabilities are also being developed to enhance support to ground maneuver forces. Additionally, the Army is currently using Big Crow, operated by the Army Space and Missile Defense Command (SMDC)/Army Strategic Forces (ARSTRAT) Space Electronic Warfare Detachment (SEWD), as a space control asset to support current operations. Big Crow is a multifaceted electronic warfare (EW) test bed capability that assesses and stresses space control systems in development that also has operational applications. The Army is conducting S&T and research, development, test and evaluation (RDTE) efforts, developing doctrinal, organizational and operational concepts; and planning an acquisition strategy to bring new space control capabilities to the warfighter. The Army is also partnering with sister Services to pursue terrestrial-based space control solutions for direct Army and Joint Force support.

CBRN Defense Capabilities

The Army's dedicated chemical, biological, radiological and nuclear (CBRN) defense units; corps of trained defense experts; and enhanced nuclear, biological and chemical medical treatment capabilities significantly mitigate the effects of threat CBRN weapons employment. The Army's concept to employ focused defense against CBRN weapons enables units to operate at the lowest required protective posture without increasing risk to the Soldier. CBRN reconnaissance and surveillance units, with their point and standoff detectors and battle management/C2 procedures, are the principal means of contamination avoidance. This protection extends throughout the full spectrum to include homeland defense. The Army is augmenting installation commanders with the ability to respond to terrorist and CBRN attacks through dedicated force structure and training.

CBRN defense systems, obscurants and their enabling technologies allow the Army to fully achieve force protection, information dominance and full-dimensional protection in a WMD environment. The Army's CBRN defense strategy is to employ a focused defense against CBRN threats so that only units directly affected by the hazard would be warned to take protective measures. Using focused defense, large numbers of units will no longer assume full protective posture as a precautionary measure. Focused defense allows units to operate in the lowest required protective posture without increasing the risk to Soldiers. The Army's obscuration strategy is to deny the threat's use of the visual as well as the electromagnetic spectrum while preserving our ability to exploit it at will.

In addition to providing the means of general CBRN defense and obscuration common to all units, the Army provides increased CBRN defense and obscuration capabilities with specialized chemical units. CBRN reconnaissance and surveillance units, with their point and standoff detectors, are the principal means of contamination avoidance. Biological detection units provide capabilities to shorten response times to initiate the medical response to the growing threat of biological warfare (BW) agents. Decontamination units restore combat power after resources (personnel, equipment and facilities) are contaminated.

The CBRN defense mission area also includes the Army's efforts to address homeland security. Today, the nation recognizes that CONUS installations and power projection platforms are no longer sanctuaries. The very ability to execute our force projection strategy requires CBRN focused defense over strategic forces and the means to employ them from premobilization through conflict termination and demobilization.

Chemical Vision 2010 is the implementing vision of the Army's CBRN defense modernization effort. It enables the commander to minimize casualties and preserve combat power in a CBRN environment and to create information superiority by using command and control information systems and obscurants. Operationally, if the enemy has an offensive CBRN capability, our primary goal is to deter the threat's use. If deterrence fails, the mission is to defend against a CBRN attack with minimal casualties and degradation, allowing commanders to quickly restore full combat power and continue their mission across the full spectrum of operating environments.

The principles of CBRN defense in *Chemical Vision* are sense, shape, shield and sustain. The principles of obscuration are sense, shape, shield, attack and deceive. These principles support the patterns of operations

in *Army Vision 2010* (protect the force and information dominance) and the principles in *Joint Vision 2020* (full-dimensional protection and information operations).

In providing the CBRN defense and obscuration systems for the Army's transformation strategy, the Army will equip its specialized chemical units and provide CBRN defense and obscuration items common to all units in accordance with the three tenets of the Army's overall modernization strategy: (1) focusing S&T efforts on the future force, (2) meeting immediate SBCT operational needs, and (3) maintaining and improving the warfighting capabilities of the rest of the current force through a judicious combination of selected modernization, recapitalization and sustained maintenance of essential systems. The following paragraphs elaborate on some of the key CBRN systems in the Army's modernization plans, although additional systems are also under development.

Discussion of Key CBRN Modernization Programs

M31A1/M31E2 Biological Integrated Detection System (BIDS)

Description. The BIDS is a collectively protected, shelter-mounted on a dedicated vehicle (HMMWV), and equipped with a biological detection suite employing complementary technologies to detect large-area biological attacks. The M31E2 BIDS is capable of detecting all types of BW agents in less than 10 minutes, and identifying any 10 agents simultaneously in less than 30 minutes.

Program Status. The M31A1 and M31E2 versions of the BIDS are currently fielded. All new activating units will receive the M31E2 version.

Stryker-Nuclear, Biological and Chemical Reconnaissance Vehicle (NBCRV)

Description. The Stryker-NBCRV will incorporate the Block II NBCRV integrated chemical and biological point detectors that will allow on-the-move standoff biological and chemical agent detection. The Chemical Biological Mass Spectrometer (CBMS) Block II will improve the detection and identification of liquid chemical agents while providing a first-time biological agent detection capability to the reconnaissance platform. The Block II sensor suite will automatically integrate contamination information with data from onboard navigation and meteorological systems and rapidly transmit contamination hazard and noncontaminated area intelligence to the appropriate operations center. Integration of the common CBRN technical architecture will allow for expansion/upgrading of the onboard computers at minimal cost, as well as the command and control of CBRN-sensing UAVs and unmanned ground vehicles (UGVs) in the future force system.

Program Status. Stryker-NBCRV Milestone C was reached in 4QFY04, allowing the start of LRIP. Production verification testing and IOT&E are planned for FY06-07. The Stryker-NBCRV will begin fielding to SBCTs in FY06.

M56 Wheeled Smoke System (Coyote)

Description. The M56 Coyote provides large-area, multispectral screening for maneuver and support forces from the M1113 HMMWV. The M56 Coyote can generate large-area obscurants throughout the bat-

tlespace to counter enemy reconnaissance, surveillance and target acquisition systems. Missions include providing static and mobile visual, infrared screening in the form of a haze, blanket and curtain. Major components include a turbine smoke-generating system. It has the capability of providing continuous visual smoke for up to 90 minutes and 30 minutes of infrared screening smoke. A proposed P3I can add a 30-minute millimeter wave obscuring capability to defeat enemy radar RSTA devices and weapon systems. A two-person crew operates the M56 and has the capability to counter the threat arising form the wide proliferation of advanced visual and IR sensors.

Program Status. Fielding of the M56 is complete. Potential limited application of the MMW P3I begins in FY06 to previously fielded systems. The AAO of 265 has been met.

Vehicle Obscuration Smoke Systems (M6 and M7)

Description. Vehicle obscuration smoke systems provide an immediate smoke screen that can obscure threat surveillance, target acquisitions, and weapon guidance systems in the visual through infrared spectrum. The system provides approximately 20-120 seconds of obscuration, which enables the vehicle to maneuver out of the immediate threat area. The M6 countermeasure discharger is installed on Stryker platforms to provide this capability. The M7 Light Vehicle Obscuration Smoke System provides this capability for up-armored HMMWVs. Both systems utilize 66-mm grenades and a launcher configuration of four tubes. Multiple launcher systems are utilized to provide all-around screening capability.

Program Status. The M6 program is currently funded to equip all SBCTs. The M7 is not currently funded to fulfill all requirements for FY08-13.

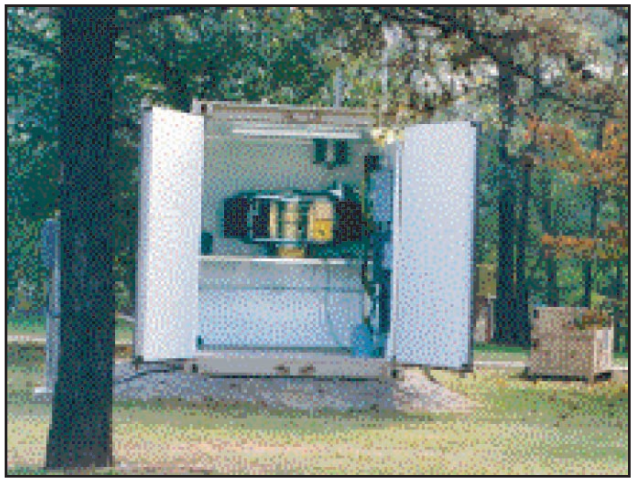
Chemical Biological Protective Shelter System (CBPSS)

Description. The CBPSS is a highly mobile, chemically protected shelter system designed for emergency medical use in the forward battle areas. The shelter consists of an airbeam-supported soft shelter offering 300 square feet of working space, power systems and environmental control equipment. The foldable shelter, power system and environmental control equipment is housed on a lightweight multipurpose shelter, mounted on an expanded capacity vehicle with a modified 1-1/4-ton, high-mobility trailer which has a permanently mounted generator.

Program Status. CBPSS will produce the new M2 electric version in FY06, retrofit the current fleet of 195 systems to the electric version in FY06-07 and produce an additional 174 M3 electric systems beginning in FY07. Fielding will continue through FY11.

Joint Portal Shield (JPS) Detector System

Description. The JPS is DOD's first automated networked biological detection



systems. The system uses an innovative network of sensors to increase probability of detecting a BW attack while decreasing false alarms and consumables. The JPS system can detect and presumptively identify up to eight BW agents simultaneously in less than 25 minutes.

Program Status. The JPS operates in Korea and Southwest Asia. Twelve additional sites have been directed by the Deputy SECDEF for Pacific Command and Central Command Combatant Commanders. The Defense Emergency Response Fund (DERF) funds the upgrade of 237 fielded portal shield units with Biological Aerosol Warning Sensor (BAWS). Fifty-four additional units will be procured as part of CB installation protection equipment.

Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD)

Description. The JSLSCAD is a lightweight, passive, standoff and chemical agent detector capable of providing up to 360-degree, on-the-move vapor detection from a variety of tactical and reconnaissance platforms at distances up to 5 km. The JSLSCAD facilitates enhanced early warning for contamination avoidance and will provide lead time for units and Soldiers to increase their protective posture.

Program Status. The JSLSCAD is in a five-year developmental effort that includes ground-, air- and sea-based platforms. Increment I provides initial capability to the Stryker-NBCRV. Increment II will seek a commercial off-the-shelf solution to support all ground-mobile, fixed-site and shipboard applications, achieving FRP in FY08. Increment III will integrate and test the Increment II design into aerial platform applications.

Joint Chemical Agent Detector (JCAD)

Description. JCAD will be a combined portable monitoring and small point chemical agent detector for individual Soldier applications. This handheld, pocket-sized detector will be designed to automatically detect, identify and quantify chemical agents. The primary function of the JCAD is as a chemical weapon agent (CWA) point detector that can be used to detect, identify, quantify and warn personnel of the presence of vapor CWAs.

Program Status. Testing of a candidate system is underway at Edgewood Chemical Biological Center. Increment I fielding is scheduled for 4QFY07.

Joint Chemical, Biological, and Radiological Agent Water Monitor (JCBRAWM)

Description. The JCBRAWM will provide the warfighter the capability to detect, identify and quantify the presence of CBR contamination in water. The ICD, approved 2 Apr 04, describes the need for monitoring to protect the warfighter from drinking or using contaminated water. The JCBRAWM will detect and identify CBR agents during three water-monitoring missions: source site selection, treatment verification and quality assurance of stored and distributed water.

Program Status. Milestone A entrance criteria were approved by the Joint Service Technology Office (JSTO) in FY05 for the Chemical Biological Defense Program to transition from concept refinement to technology development. Milestone A is scheduled for Dec 05.

Joint Warning and Reporting Network (JWARN)

Description. The JWARN provides standard integration and analysis of NBC detection information with command, control, communications, computers, information and intelligence (C4I2) on the battlefield. JWARN automates the NBC warning and reporting processes now performed manually throughout the Services. It will provide additional data processing, production of plans and reports, and access to specific NBC information to improve the efficiency of NBC personnel.

Program Status. Block I (D) software featuring some functionality has been fielded and is in use in many major Army commands (MACOMs). The JWARN IOC is scheduled for 1QFY08. IOC will be achieved when JWARN is fielded to initial units and training bases, unit personnel are trained, training base is established, and a maintenance system is in place.

Joint Effects Model (JEM)

Description. JEM will provide the commander with advanced modeling and simulation capability to forecast and display the effects of CBRN events, including toxic industrial hazards (TIH), based on inputs from JWARN-networked sensors, intelligence and other units. JEM supports force protection and operational deployment planning by providing critical CBRN/TIH planning and defensive information.

Program Status. JEM Increment-I is currently in the SDD acquisition phase. Milestone C is expected in 3QFY06.

Joint Portable Decontamination System (JPDS)

Description. JPDS will be a man-portable system consisting of decontamination applicators and decontaminants for use primarily in immediate and operational decontamination operations.

Program Status. IOC Increment I is scheduled for FY12. FOC Increment I is scheduled for FY13.

Joint Service Sensitive Equipment Decontamination (JSSED) System

Description. The JSSED system will provide a nonaqueous capability to decontaminate CB warfare agents on high-value or sensitive equipment that cannot be decontaminated and reused through current decontamination procedures. The JSSED decontamination process can reach into contaminated areas of equipment that are not accessible via a surface wipe. JSSED will limit the transfer of contamination, restore mission essential functions, increase survivability, lower the levels of MOPP sooner, lower logistics costs through the reuse of high-cost sensitive equipment, and allow maintenance personnel to be able to work on the equipment without having to wear protective clothing.

Program Status. IOC is scheduled for FY12. FOC is scheduled for FY14.

Joint Service Transportable Decontamination System (JSTDS)

Description. This mobile system provides the capability to conduct operational and

thorough decontamination of medium-to-large mobile or fixed equipment, aircraft, facilities, shelters, surface areas and terrain. The small-scale system (JSTDS-SS) replaces the M17 LDS and M12A1s in non-SRC03 units. The small-scale system will not require MHE and will not require a dedicated vehicle.

The large-scale system (JSTDS-LS) will be integrated into or mounted on a dedicated vehicle/system. Specifically, this will be a cross-spectrum system designed to support current and future forces, or homeland security operations. It will be capable of decontaminating fixed sites, terrain, large aircraft and seaports of debarkation (SPODs)/aerial ports of debarkation (APODs).

Program Status. For the JSTDS-SS, Milestone B ORD was signed on 1 Mar 04. Milestone B was achieved 18 Jan 05. Milestone C decision is scheduled for Apr 06. IOC is scheduled for FY10. FOC is scheduled for FY12. For the JSTDS-LS, Milestone B ORD was signed on 1 Mar 04. IOC of 350 systems is scheduled for FY13. FOC is scheduled for FY15.

Joint Service Personnel/Skin Decontamination System (JSPDS)

Description. JSPDS replaces the M291 SDK and will decontaminate the skin, individual equipment and weapons of personnel and casualties, including those with wounds that have been exposed to CBRN warfare agents/contamination and toxic industrial materials/toxic industrial chemicals (TIMs/TICs) and nontraditional agents (NTAs). IOC is scheduled for FY07 and will be achieved when JSPDS is fielded to forward-deployed units, rapid deployment units and the training base; unit personnel are trained; a training base is established; and a maintenance system is in place.

Program Status. Milestone B was achieved on 18 Jan 05. IOC is scheduled for FY10. FOC is scheduled for FY13 and will be achieved when the JSPDS AAO is reached and all authorizations are filled. Total number of systems is 2,285,451.

Joint Platform Interior Decontamination System (JPID)

Description. The JPID system will provide the capability to decontaminate CB warfare agents within interiors of aircraft, vehicles, ships and buildings (to include avionics, electrical, electronic and environmental system equipment) and the associated cargo without damaging surfaces or sensitive equipment within the platforms. The JPID will provide immediate, operational and thorough decontamination capabilities in hostile and nonhostile environments. Currently, no standard methods of decontamination of platform interiors exist. This capability will provide the warfighter the means to maintain operational tempo and ensure platforms are not sidelined from the mission environment due to interior CB contamination. The JPID system will significantly enhance the future force's ability to remain mission capable in a CBRN environment

Program Status. The IOC for this system is projected in FY10, with FOC planned for FY13.

M100 Sorbent Decontamination System (SDS)

Description. The M100 SDS uses a reactive sorbent powder to remove chemical agents from surfaces. Use of the M100 SDS decreases decontamination time and eliminates the need for water.

Program Status. With initial issue complete, the M100 is now available for purchase using normal supply channels.

Joint Service General Purpose Mask (JSGPM)

Description. The XM50 and XM51 are two new protective masks that make up the JSGPM lightweight mask system. Each mask consists of a face-blank assembly (singular skin molded in small, medium and large sizes, and incorporating provisions for lenses), front module cover, head harness assemble (mesh-type head harness), self-sealing valve, inlet/outlet valve, internal drink tube (external drink tube assemble), carrier, waterproof bag, canteen cap, dust cover, laser outsert, primary filters (filters out chemical/biological agents, and radioactive and other particles from contaminated air), operator cards and accessories as required. The masks allow intelligible voice transmissions (face to face and three meters apart).

Program Status. The JSGPM mask program will begin FRP in Oct 06 and will accomplish FUE in Dec 06. Fielding is scheduled to continue beyond FY11. The program is funded for a total of 2, 344,168 masks to support the Army, Air Force, Coast Guard, Marine Corps and Navy requirements. The XM50 mask replaces the existing M40 individual mask, and the XM51 replaces the M42 crew member mask. The older masks are at the end of their service life.

Joint Biological Agent Identification and Diagnostics System (JBAIDS)

Description. The JBAIDS program is the first effort by the DOD to develop and field a common medical test equipment platform among all the Services. JBAIDS is an evolutionary, three-block, reusable, portable and modifiable biological agent identification and diagnostic system capable of simultaneous reliable identification of multiple biological agents of operational concern and other pathogens of clinical significance. JBAIDS Block I tests a variety of environmental samples and clinical specimens for nondiagnostic purposes, and performs confirmatory testing of samples collected by existing and future biological detection systems. Block II focuses on the militarization and hardening of critical toxin identification technologies based on a COTS/NDI candidate system. JBAIDS Block III is planned to be a handheld, FDA-approved device capable of providing the full range of biological agent identification and diagnostics.

Program Status. Block II development is scheduled for FY07.

National Guard Weapons of Mass Destruction Civil Support Team (WMD-CST) Unified Command Suite (UCS)

Description. The UCS provides the WMD-CST with mission essential C4 support. The UCS capability includes state-of-the-art radio, and satellite and cellular communications subsystems that will provide dedicated LOS and NLOS secure and nonsecure intra-team and intra-vehicular voice and data reachback. The UCS provides voice, data and video reachback capabilities to WMD-CST operations centers, incident command posts, and the various military forces, federal, state and local law enforcement and emergency service units that support domestic incident responses. These communications subsystems operate in handheld, base station and vehicle configurations capable of interoperating with military and commercial radio communications systems in various terrain and urban environments.

Program Status. In production and fielded with National Guard WMD-CSTs throughout the United States. This system is currently not overseas deployable.

National Guard Weapons of Mass Destruction Civil Support Team (WMD-CST) Analytical Laboratory Suite (ALS)

Description. The ALS provides the WMD-CST with a mobile laboratory capability that allows CST commanders to analyze samples on-site in support to the first responder incident commander. The ALS is a mobile analytical laboratory capable of providing the CST a presumptive analysis for the presence of chemical, biological or radiological contamination. The ALS is a System Enhancement Program to replace the current Mobile Analytical Laboratory System and interim Dismounted Analytical Platform. The ALS provides advanced technologies with enhanced sensitivity and selectivity in the detection and identification of chemical warfare agents and toxic industrial materials.

Program Status. In production and fielded with National Guard WMD-CSTs throughout the United States. This system is currently not overseas deployable.

CBRNE Installation Protection Program (IPP)

Description. This program, initiated after the catastrophic attacks in 2001, will provide installations with an integrated and effective CBRNE installation protection capability consisting of CBRNE detection, identification, warning, protection, decontamination, information management, medical protection, surveillance and response. The program objective is to improve the installation's emergency first responder capability and leverage existing physical security, logistics, sustainment, maintenance and C2 capabilities to maximize effectiveness while reducing the resource impact (time, funding and personnel) on the installation.

Program Status. The first installations fielded with their initial CBRNE response capability sets were in FY05. The remainder of the initial 62 installations will be equipped through FY11. This program is currently funded to address 62 of 187 Army posts. The systems provided to the installations are not deployable.

CBRN Summary

Among the significant changes to the future strategic environment, proliferation of WMDs is recognized as a principal asymmetric threat capable of providing an adversary military advantage to neutralize overwhelming conventional superiority. Having an effective CBRN defense is a necessary component of any defense strategy that seeks to demonstrate to the adversary that use of WMDs will not gain the advantage sought. Modernizing the force while conducting a robust S&T effort is critical to preventing technological surprise from new CB agents or different employment means. Recapitalizing and maintaining the current force is necessary to enable transformation and mitigates risk by extending the useful life of current systems within fiscal constraints. This modernization plan assures a disciplined approach to meeting mission-based requirements and secures orderly change as we transition to the future force.

Discussion of Key Equipment Protecting Against IEDs

Warlock/CREW

Description. Warlock is a family of electronic

countermeasure systems designed to protect personnel and vehicle convoys and provide gate security from radio-controlled improvised explosive device (RCIED) ambushes. It is a quick-reaction capability (QRC) developed by the Army, Navy and U.S. Special Operations Command (USSOCOM) that is currently providing force protection in Operation Iraqi Freedom and Operation Enduring Freedom. The new term used for electronic countermeasures is Counter RCIED Electronic Warfare (CREW). While the Warlock name is still used, the Warlock family of systems is considered CREW Increment 1.

Program Status. Warlock/CREW is not a program of record and is not included in the FY06-11 program plan. This initiative program is sponsored by the Joint IED Defeat Organization, which coordinates all counter IED efforts within DOD. Funding has been received from congressional additions, the Iraqi Freedom Fund, the Rapid Equipping Force (REF), and a DOD funding decision. Working against a rapidly evolving threat, the CREW program manager awarded a contract in Jun 05 to produce, field and support a next-generation capability against RCIEDs, with ongoing efforts to surge and accelerate the production schedule in support of the global war on terrorism requirements. The new contracted system is called CREW Increment 2 (CREW-2). It is anticipated that CREW-2 will become an Army program of record beginning with the FY08-13 program plan. Currently, nearly 20,000 CREW Increment 1 devices are fielded in support of OIF/OEF.

Appendix 3: Focused Logistics (FL)

Simply put, focused logistics (FL) means providing the most effective and efficient full-spectrum logistics support to the joint warfighter. FL ensures we provide the Joint Force with the right personnel, equipment, supplies and services in the right place, at the right time, in the right quantities across the full range of military operations. The *Army Modernization Plan* includes critical programs to achieve our three major thrusts of achieving visibility of the entire logistics domain including requirements, resources and priorities; responding with speed and precision to meet the needs of the Combatant Commander; and ensuring logistics unity of effort across the Joint Operations Area (JOA). This appendix provides a brief discussion of the Army's FL capabilities that support required Joint Force capabilities and the key materiel programs associated with these capabilities.

Improving Unity of Effort

The Army must ensure unity of effort in planning and executing logistics operations across the JOA. We will achieve logistics unity of effort through theater sustainment commands (TSCs) and a command and control structure that links all Army theater logistics units to a single command and control element that is also joint-capable. We have transformed our logistics forces to provide TSCs that are regionally focused and globally employable and that have deployable command posts capable of rapidly establishing and sustaining operations. These TSCs have reachback capability to the CONUS sustaining base through the Army Sustainment Command, a major subordinate command of the Army Materiel Command. These interconnected commands, closely linked with our joint and strategic logistics partners, will provide us the ability to rapidly open a theater, effectively coordinate logistics efforts to support the Joint Force commander, and maximize efforts of the end-to-end logistics domain to sustain operations.

We have resourced modular BCTs to be self-sustaining for expeditionary operations. Above the BCT level, our sustainment brigades and their subordinate modular units provide the capabilities to support units within their area of operations for extended campaigns. Providing the right balance between brigade CSS and echelon-above-brigade CSS will ensure we achieve an expeditionary Army with campaign qualities that operates as a critical part of the joint force.

Our modular units will employ advanced technologies, including an extensive array of networked ground, air and space sensors to provide the commander an unprecedented logistics operating picture. Future data fusion and architectures such as the Army's LandWarNet, coupled with innovative leader training, will enable logistic decision-makers visibility of synthesized sustainment requirements. The COP will provide near real-time status and locations of inventories to effect combat power. This will enable the commander to develop and evaluate effective offensive and defensive courses of action in line with logistical parameters.

The COP allows leaders of the Joint Force to understand current logistics postures and supplies and the ability to respond to known requirements. Leaders at all levels—strategic, operational and tactical—will use the COP to analyze and share assessments through a collaborative planning process enabled by information technologies. This is made possible through a real-time, web-based information system providing accurate, actionable visibility as part of a common logistic operating environment (CLOE), effectively linking the operator and the logistician across joint forces and from foxhole to the national level. Key support functions include deployment distribution, global mobility, ability to sustain the force and medical support to combat forces.

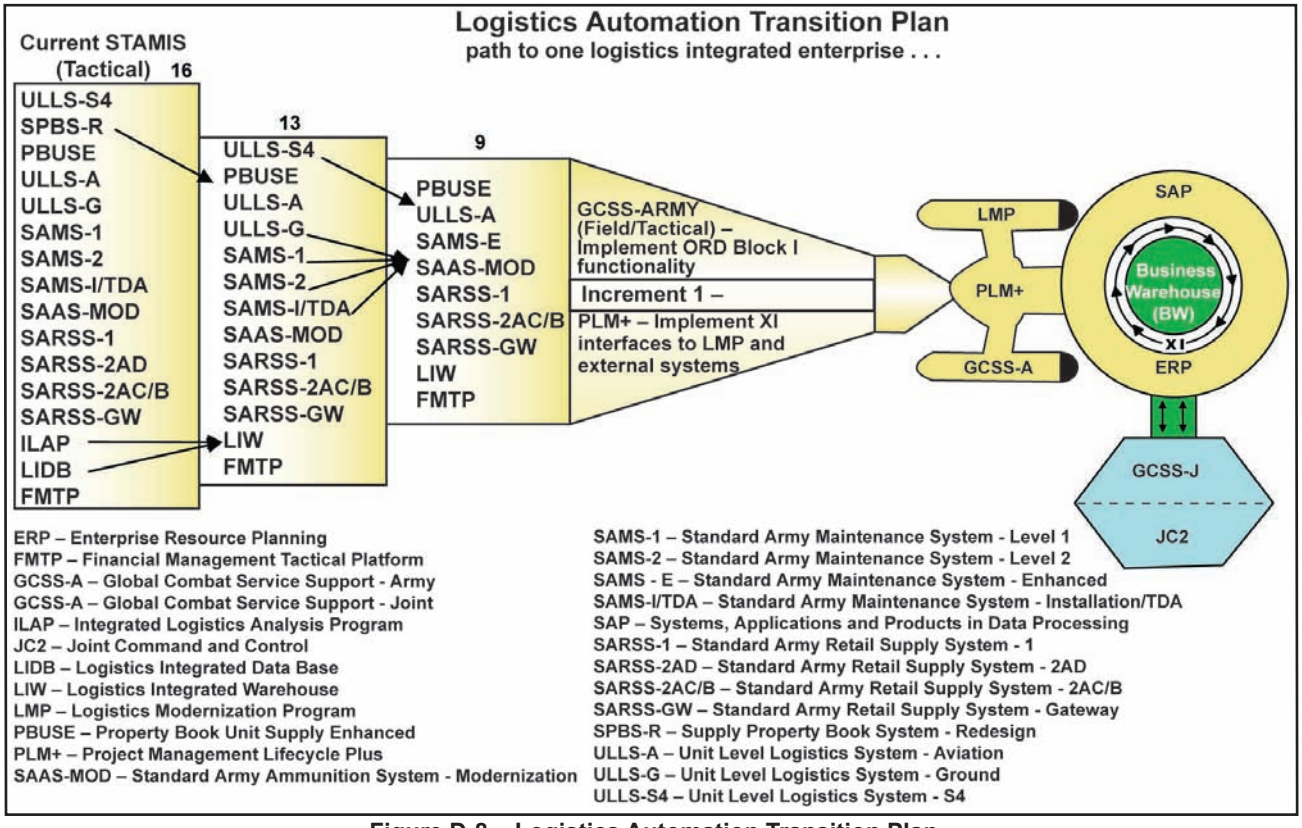


Figure D-8. Logistics Automation Transition Plan

Future force commanders will be able to leverage this information to enhance collaborative planning, reduce the decision cycle, seize the initiative, and build combat power prior to, during and after operations. To achieve the required unity of effort and domain-wide visibility, the Army will migrate 16 current logistics standard Army management information systems (STAMIS) into GCSS-Army to create a single logistics integrated enterprise as shown in Figure D-8. These systems are currently used in every unit in the Army to provide maintenance, supply, ammunition, property, fleet and tactical financial operations and management. By transforming these systems into a single, integrated enterprise that incorporates interoperable joint capabilities and best business processes, we will increase unity of effort in planning and executing Army and joint operations.

As we implement this migration we must continue to maintain and upgrade our current systems until our enterprise system, GCSS-Army, is fielded. We will continue the fielding of BCS3, which is embedded within the ABCS. ABCS/BCS3 is interoperable with both joint and multinational systems and has improved the connectivity between tactical, operational and strategic units and provides a logistical COP to all commanders. We will also continue fielding the Medical Communications for Combat Casualty Care (MC4)/Theater Medical Information Program (TMIP) applications that link the combat medic to field health care facilities.

Discussion of Key Unity of Effort Programs

Global Combat Support System-Army (GCSS-Army)

Description. GCSS-Army is the primary enabler of the Army's Combat Support/Combat Service Support (CS/CSS) transformation. GCSS-Army streamlines the CS/CSS tasks and provides a web-based, Enterprise Resource Planning (ERP) solution replacing all existing stovepiped logistics STAMIS. GCSS-Army provides CSS information and field services management at the Army's tactical and operational levels. GCSS-Army has two components: a functional component for deployable forces titled GCSS-Army Field Tactical (GCSS-Army (F/T) and a technology-enabler component titled Product Life-cycle Management Plus (GCSS-Army (PLM+). GCSS-Army (F/T) and GCSS-Army (PLM+) coupled with the Logistics Modernization Program (LMP) make up the three key components of the Single Army Logistics Enterprise (SALE) architecture.

Program Status. GCSS-Army is currently in the technology development phase. Active Army MACOM, National Guard Bureau and Army Reserve subject matter experts from the Quartermaster, Ordnance, Aviation, Transportation, Medical and Finance Corps have joined forces with SAP consultants, Northrop Grumman (lead system integrator) and engineers from the U.S. Army Information Systems Command to form the GCSS-Army team. Blueprinting workshops have described and refined current Army logistics processes, determine "best fit" for those processes using SAP COTS software, and produce detailed models of the "to be" business processes. These have been adapted into proven industry best business practices in order to modernize CS/CSS automated procedures. GCSS-Army is scheduled for Milestone B acquisition decision in 2QFY06.

Battle Command Sustainment Support System 6.4 (BCS3)

Description. The BCS3 is a decision-support system embedded within the overall ABCS

that assists commanders and their staffs in planning and executing CSS operations and is key to building and sustaining combat power in a continuous operational environment over extended distances. BCS3 will rapidly collect, store, analyze and disseminate critical logistics, medical and personnel information. BCS3 is the CSS component of the ABCS, as well as a key logistics enabler in the Army's transformation efforts, and will be interoperable with GCSS-Army. BCS3 is comprised of computer units, common operating software and unique software. BCS3 is deployable in a tabletop configuration, with or without storage/transit cases, and in Standardized Integrated Command Post System (SICPS) configurations.

Program Status. Completed fielding BCS3 6.4 to the 4th ID (designated test unit) in Nov 04, and fully engaged in the Army G-3-approved ABCS 6.4 fielding. BCS3 6.4 will continue to field to ABCS 6.4 designated units, along with HQDA-directed fieldings to support other deployed, deploying and transforming units.

Medical Communications for Combat Casualty Care (MC4) System

Description. The MC4 system is a theater level, automated combat health support (CHS) system that links commanders, health care providers and medical support providers at all levels with seamless, integrated medical information. It will receive, store, process, transmit and report medical C2, medical surveillance, casualty movement/tracking, medical treatment, medical situational awareness, and medical logistics data across all levels of care. The MC4 system is fully operational with standard Army systems and operates on standard commercial hardware. The MC4 system is fully joint-operations compatible and operates from a family of joint software. The MC4 system supports the commander with a streamlined personnel deployment system using digital medical information.

Program Status. The MC4 program has a JROC-approved ORD. The program received an Acquisition Decision Memorandum for a successful FRP on 21 Jul 05. The program's C4 Integrated Support Plan (C4ISP) was approved by the Army G-6 on 13 Sep 05. The MC4 program will continue to field systems in accordance with the Army Campaign Plan and priorities.

Achieving Domain-Wide Visibility

Our success in future campaigns relies on a joint-capable logistics community that maintains domain-wide visibility over requirements, resources and priorities.

Our vision is that warfighters and logisticians will have total situational awareness of all aspects of logistics, from laboratory to factory to foxhole and back. Army logisticians will provide certainty to the supported Joint Force commander—certainty that forces will receive the right support, at the right place, at the right time, across the full spectrum of military operations.

Domain-wide visibility is also key to reducing stockpiles in theater through sustained velocity management and real-time tracking of supplies and equipment.

Future combat force units will "see first" by identifying current status of equipment readiness, anticipating sustainment requirements, and ensuring the flow of logistics to enhance combat power. Our programs to achieve unity of effort are also integral to improving domain-wide visibility. GCSS-A, BCS3 and Transportation Coordinators' Automated Information for Movement System II (TC-AIMS II) will enhance the deployment and sustainment of forces by facilitating the exchange of data between Army units and the Combatant Commanders, thus providing improved visibility and enabling faster response to unforeseen circumstances.

Today, sensors (RF tags and interrogators) coupled with the Movement Tracking System (MTS) have enabled a clear picture of the movement of supplies to the warfighter. Property Book Unit Supply Enhanced (PBUSE) and Standard Army Maintenance System (SAMS-E) remain critical to visibility, control and maintenance of Army equipment. In the future, the Army will continue efforts to more effectively connect our logisticians and further improve visibility over requirements, resources and priorities.

Discussion of Key Domain-Wide Visibility Programs

Movement Tracking System (MTS)

Description. MTS is a critical logistics transformation enabler. It provides continuous CS/CSS asset visibility and situational awareness for the joint logistics corporate enterprise, enables expeditionary logistics, and is a key step in achieving the sense-and-respond capabilities required to support network-centric warfare operations. MTS assists CS/CSS unit commanders in planning and executing operations with the capability to identify and track positions, monitor progress, and communicate with tactical wheeled vehicles supporting CS/CSS operations essentially anywhere in the world. MTS supports BFT by passing position location information into the logistics COP via BCS3. MTS is a satellite-based tracking/communications system consisting of mobile units, transceivers, control stations, a GPS, common operating software and MTS-unique software.

Program Status. MTS has been fielded with priority given to units supporting OIF.

These have included the 3rd ID, 4th ID, 10th Mountain Division, 101st Airborne Division (Air Assault) and SBCTs. The system will continue fielding with phased upgrades to include embedded GPS, integrated radio frequency identification (RFID) and anti-spoofing technology.

Property Book Unit Supply Enhanced (PBUSE)

Description. PBUSE is the Army's web-based property accountability system. PBUSE replaces the Standard Property Book System-Redesign (SPBS-R) and Unit Level Supply System-S4 (ULLS-S4) to network and simplify accounting for property. PBUSE provides centralized asset accountability and complies with the Chief Financial Officer (CFO)/Federal Financial Management Improvement Act (FFMIA). Army-wide improvements include an enterprise assets database, graphical user interfaces and process improvements to simplify lateral transfers. PBUSE enables the modular Army to transfer, task-organize, replenish and account for property. It is a key enabler for converting the Army to modular formations, equipping the force, and ensuring end-to-end visibility and property accountability.

Program Status. The Army is completing its fielding of PBUSE to property book offices and will complete the unit-level fieldings in FY07.

Standard Army Maintenance System (SAMS-E)

Description. SAMS-E is the Army's web-enabled maintenance management system. SAMS-E replaces Unit Level Logistics System-Ground (ULLS-G) and three legacy echelons of SAMS to network and simplify maintenance management, enable two-level maintenance, and comply with DOD requirements for materiel condition status reporting. SAMS-E modernizes the Army's automated unit-level maintenance, repair parts supply, readiness reporting and automated dispatching. SAMS-E, when linked via CSS SATCOM, eliminates the requirement for an inefficient "sneaker-net" and delivers repair parts in record time. SAMS-E also simplifies the means to task-organize units for support, provides orphaned unit maintenance, and serves as the key enabler for efficiently maintaining the force.

Program Status. The Army has begun fielding of SAMS-E to modular, deploying forces and will complete fielding in late FY07.

Improving Rapid and Precise Response

Logistics success in an expeditionary environment is measured in our ability to respond with speed and precision to operational needs of the joint force. These needs encompass both deployment and sustainment over time.

Title 10, U.S. Code, states that the Army is responsible for conducting prompt and sustained operations on land as a component of the Joint Force. Fulfilling this responsibility rests, to a very large extent, on the Army's ability to rapidly project lethal, survivable and sustainable combat power as part of the joint force. While the Army depends on Joint Force projection capabilities, we continue our own efforts to enhance our deployment capability and responsiveness while reducing our deployment requirements.

We have increased our capabilities to defeat both anti-access and area-denial efforts through speed of deployments, leveraging information technology, modular force design, future concepts and improved equipment. The Army provides unique capabilities to

achieve, enhance and maintain assured access. We have reviewed the current security environment and initiated actions to reposition forces and equipment to support today's security environment and tomorrow's emerging threats. Forward-deployed forces, prepositioned stocks, regional bases/strategic flotillas and facilities, assured access through standing agreements with allies and other nations, regional engagement by special operations and conventional forces, and multinational exercises are all instrumental in shaping a position of strength in a given region.

Force Projection and Sustainment Lift Capabilities

Previous wargames and analysis efforts have shown that advanced strategic and intra-theater air- and sealift platforms are required to support/enable our future warfighting concepts. Future lift platforms must provide enhanced capabilities to meet the warfighter's force projection, distribution and sustainment requirements.

Sealift

Most current DOD sealift platforms are deep draft vessels (≥ 30 feet) that require commercial deep-draft ports to load and offload unit equipment (roll-on/roll-off). Current DOD and commercial vessels which move either containerized equipment or sustainment stocks also require the developed infrastructure (cranes, piers, staging yards) of major commercial ports to support vessel loading and offloading operations. The availability of such ports is limited worldwide and they are located in the commercial and population centers of most countries. These major seaports of entry represent highly predictable and limited locations for DOD force projection and sustainment operations. These ports make our operations vulnerable to many anti-access measures which would jeopardize the deployment of the Joint Force. Advanced joint sealift capabilities that enable us to rapidly project forces to multiple smaller, more austere (less infrastructure) ports of entry and to interface with other sealift platforms within a joint sea base are critical to support efforts required to defeat expected anti-access and area-denial efforts in the future. Inter- and intra-theater sealift vessels that combine the attributes of high-speed, shallow draft and self-employable cargo load and offload systems can leverage a far larger number of ports beyond the limited number (and geographically located) large commercial ports of the world. Advanced sealift platforms support the concept of multiple, parallel seaports of debarkation, fundamental in overcoming anti-access challenges.

Airlift

Existing strategic air platforms such as the C-5 Galaxy and C-17 can carry enormous loads, but are dependent on world-class airports for both embarkation and debarkation. The C-17 provides the only capability today of bypassing these major chokepoints from appreciable distances while maximizing load capacities. Even so, the C-17 is still constrained to at least a 3,000-foot runway and in many cases (weather, terrain and environment dependent) may require longer runways. The C-130, in its intra-theater role, is hampered by significant payload, altitude and range limitations and cannot be refueled in air. These capability limitations not only severely constrain our ability to execute assured access strategies, they demand a nearby intermediate staging base to transload equipment, personnel and sustainment from inter- to intra-theater lift platforms and to provide a refueling base for intra-theater platforms. None of the airlift platforms are suitable for air sustainment, nor can they support rapid shift of maneuver

forces and sustainment across the breadth and depth of the battlespace.

To overcome the limitations of these strategic air platforms, larger-capacity Super Short Takeoff and Landing (SSTOL) and/or Heavy Lift Vertical Takeoff and Landing (HLVTOL) platforms are required in substantial quantities for air movement of the future force. Shallow-draft, high-speed sealift and advanced, intra-theater sealift designs are required for austere seaport access. Whether the goals encompass operational maneuver from strategic distances, use of multiple simultaneous austere points of entry, vertical maneuver and envelopment, dominant maneuver, precision engagement and focused logistics, SSTOL and HLVTOL technology solutions are needed sooner rather than later.

These kinds of platforms further provide a quality of versatility and adaptability necessary to enable Army and Joint Force commanders to adjust movement of forces and sustainment in stride in response to the evolution of the campaign and the enemy's own actions. Funding the S&T and procurement required to bring advanced lift capabilities to the Joint Force is a joint challenge. The Army alone cannot develop, procure and field such systems due to both budgetary and regulatory constraints. Instead, the Army encourages joint S&T emphasis on the following efforts.

Strategic High-Speed Sealift (SHSS). An SHSS is a strategic sealift ship (CONUS to JOA) that can deliver troops, equipment and sustainment together in sufficient size and at a considerable speed to provide immediate combat power to the Joint Force commander. Because it has been optimized (draft, length, beam) to operate in ports other than the world's limited deep-draft commercial ports, it can project DOD units (equipment, personnel and initial sustainment stocks) in a far greater number of locations than current DOD and commercial sealift assets. With a C4I suite onboard, commanders can conduct en route planning, receive intelligence updates and integrate with the Joint Force commander.

Super Short Takeoff and Landing (SSTOL) Aircraft. The SSTOL is a joint aircraft with the ability to carry two FCS platforms 3,500 miles. It can land on 750 feet of road or field in the joint area of operations, which avoids fixed airfields and adds innumerable points of entry. It provides the Joint Force commander the ability to achieve operational surprise.

Heavy Lift Vertical Takeoff and Landing (HLVTOL) Aircraft. The HLVTOL is an aircraft with the ability to deliver one FCS within a radius of 1,000 miles. The ability to insert combat vehicles vertically gives the commander unparalleled speed and agility. Generally independent of ground conditions, it enables the Joint Force commander to conduct vertical envelopment and vertical maneuver, as well as the ability to avoid predictable, linear patterns of operation. It also offers significant benefits to vertical joint logistics over-the-shore.

Low-Cost, Low-Altitude (LCLA) Airdrop Systems. LCLA is a rapidly deployable aerial resupply capability that enables and enhances logistics support to small units operating substantial distances from forward operating bases in remote, austere and hard-to-reach locations with very limited or no materiel-handling equipment and no viable airstrips to conduct air/land operations. LCLA systems cost no more than $375 per delivery system (not inclusive of supplies or cargo), are flexible and simple enough to be rigged and deployed with no specialized rigging, and can be airdropped from fixed-wing aircraft, rotary-wing aircraft or UAVs. LCLA systems can deliver up to 300 pounds of properly pack-

aged and preconfigured supplies no more than 75 meters from a predesignated impact point (IP) from an altitude of 500 feet above ground level (AGL) to as close to ground level as possible with no damage and in a condition that enables recovery by two or three Soldiers in less than five minutes per load. This capability enhances small-unit operations.

Sustainment Capabilities

Army forces must be sustainable across the spectrum of conflict. Sustainability requirements reflect the continuous, uninterrupted provision of combat service support to Army forces.

To sustain warfighters, logisticians must be able to anticipate and confirm operational requirements and then provide the right capabilities at the optimum place and time. The new concept of support relies on synergies achieved by fielding not only materiel and technology solutions, but also organizational and educational changes. This operational transformation, combined with our institutional business process transformation and policy innovation, is the basis of the Army's logistics transformation.

Discussion of Key Rapid and Precise Response Materiel Programs

Joint High Speed Vessel (JHSV)

Description. The JHSV is an intra-theater lift platform that provides advanced capabilities for the operational maneuver of combat-ready units and sustainment to smaller theater ports or sheltered shoreline areas within a JOA. The JHSV program is based upon a high-speed (40+ knots), shallow-draft, sealift platform that will maximize current commercial high-speed ferry technology. The JHSV provides the capability to conduct operational maneuver

and repositioning of intact unit sets while conducting en route mission planning and rehearsal. This intra-theater vessel provides the Combatant Commander with increased throughput, increased survivability, increased responsiveness and improved closure rates. It provides an alternative to intra-theater airlift within many theaters and allows the Joint Force commander to rapidly insert combat forces into austere ports. JHSV would provide theater force projection and sustainment lift to deploying units arriving by strategic lift (air, sea) to a theater. The vessels would be utilized to move Army prepositioned stocks (APS) located on land or afloat. JHSV supports traditional joint logistics over-the-shore (JLOTS) and future seabasing operations within an anti-access/access-denial environment. This transformation enabler helps meet force deployment goals as well as achieve full distribution-based logistics.

Program Status. The Department of the Army and Department of the Navy are combining their requirements and merging the Army's Theater Support Vessel (TSV) and the Navy's High-Speed Intra-Theater Surface Connector programs. Although the Army initially determined a requirement for 24 vessels and a critical requirement for 12 vessels, a joint requirements and solution set has not yet been determined. To insure joint interoperability, minimize redundant capabilities and gain economies of scale, the

Army and Navy have signed a Memorandum of Agreement which assigns the acquisition lead for the JHSV program to the Navy. The plans for funding the JHSV program will be determined as part of the joint acquisition process where the Navy and Army will jointly source RDTE 50/50. Each department will source their Service-unique developmental costs and each will separately fund vessels to meet their own requirements.

Joint Precision Airdrop Systems (JPADS)

Description. JPADS is a high-altitude-capable, autonomously operated precision airdrop system. The system consists of a family of different-sized airfoils, allowing airdrop of weight categories up to approximately 42,000 pounds. JPADS is not totally wind dependent and is releasable from altitudes up to approximately 25,000 feet mean sea level. Based upon winds and release altitude, 35-km standoff distances are also possible. Space-based GPS technology provides for aerial navigation/maneuverability throughout descent, steering into the wind as necessary, and permitting highly accurate ground touchdown locations. JPADS is a critical logistics transformation enabler that facilitates dedicated aerial sustainment and helps achieve full distribution-based logistics.

Program Status. Program maturity for JPADS capabilities continues through FY06. The Milestone B decision for the 2,000-pound variant is scheduled for 2QFY06. The 10,000-pound variant is currently an ACTD which is undergoing military utility assessments through FY06. The ACTD is expected to transition to program management in 1QFY07. The 30,000-pound variant is an ATO with expected transition to program management in 4QFY08. The 42,000-pound variant is currently unfunded.

Advanced Aviation Forward Area Refueling System (AAFARS)

Description. AAFARS M100A1 is a modular, four-point refueling system. The principal components are engine, pump, filter and control modules, along with hoses, nozzles, couplings, defueling pump, fuel blivets (500-gal drums), fire-suppression equipment, fuel spill containment berms, nozzles and fuel test kit. The AAFARS is transported inter-theater in three specialized shipping containers.

Program Status. Fielding began in Oct 04.

Petroleum Quality Analysis System (PQAS)

Description. The PQAS is a complete petroleum quality surveillance (QS) laboratory capable of conducting B-level testing in accordance with MIL-STD-3004 on kerosene-based (e.g., jet propellant (JP)-5, JP-8, Jet A, Jet A-1) and diesel military mobility fuels.

Program Status. Nineteen PQAS are scheduled for fielding in FY06 to combat aviation brigades.

Tactical Electric Power (TEP)

Description. TEPs are all-mobile, engine-driven, electric power generating sources,

750 kW and smaller, which are skid mounted, trailer mounted or man portable. TEPs are capable of independently producing electric power when operating on diesel, JP-8 or other fuel sources. Included are follow-on power sources such as fuel cells and thermoelectric devices. These mobile, tactical generators provide quality power to operate DOD systems away from a fixed power grid and are found in nearly every organization in the Army. They directly support all field electrical systems such as C4ISR, medical, maintenance, fire direction and controls, target acquisition, life support, sustainment and illumination. These functions are critical to mission accomplishment across the entire spectrum of military operations.

Program Status. TEP Tactical Quiet Generators (TQGs) are currently in production and being fielded. The next generation of TEP generators, the Advanced Medium Mobile Power Sources (AMMPS), reached Milestone B in Nov 03 and begins production in FY08. To date, 72 percent of the older MILSTD generators have been replaced by TQGs and 19,000 remain to be replaced by TQGs and/or AMMPS.

Standard Automotive Tool Set (SATS)

Description. SATS is a modular, flexible, standardized automotive maintenance shop system that will replace the most numerous types of field level shop sets. SATS enables a modular, expeditionary, campaign-quality force and supports the Army maintenance transformation to a two-level system. The SATS consists of a transportable, International Standardization Organization (ISO) 8x8x20 container with an integrated government-furnished, electric power generator and Environmental Control Unit (ECU). The container includes secure storage space for a complete base set of COTS and government-furnished, industrial-quality tools and equipment needed to perform field-level maintenance of military vehicles and ground-support equipment. The SATS system is a base tool set of the most frequently required automotive maintenance tools that can be augmented by modular packages that are tailorable to unit mission requirements and organizational design. SATS will eliminate obsolete tools, eliminate unneeded redundancy and inefficient tool proliferation, increase tool quality, improve transportability and improve tool accountability. The most significant advantage gained through use of SATS is its impact on the logistics footprint. This is done through standardization and modernization, which eliminates the need for four tactical wheeled vehicles and trailers.

Program Status. SATS begins LRIP in FY05 and full production in FY06 with FUE scheduled in FY06.

Family of Medium Tactical Vehicles (FMTV)

Description. The FMTV is built around a common chassis and drive train, featuring over 80 percent commonality of parts and components between models and weight classes. Operating worldwide in all weather and terrain conditions, the FMTV provides unit mobility, resupply and transportation at all organizational levels. It serves as the weapon systems platform for HIMARS and the support vehicle for Patriot. FMTV enhances crew survivability through the use of hardened cabs, three-point seat belts, central

tire inflation and machine gun ring-mount capability. It provides enhanced tactical mobility and is strategically deployable in C-5, C-17 and C-130 aircraft. FMTV reduces the Army's logistics footprint by providing commonality of parts and components, reducing maintenance downtime, and lowering operation and support costs that older trucks require.

Program Status. FMTV is in full production with over 23,148 trucks and 2,539 trailers fielded as of Oct 05. A competitive multiyear contract was awarded in Apr 03 to the current producer, Stewart and Stevenson, adding new models that include an expansible van and 10-ton dump truck. The HIMARS launcher chassis production build began in Oct 03. Current fielding supports modular transformation of infantry, heavy, Stryker, sustainment and fires brigade teams.

High Mobility Multipurpose Wheeled Vehicle (HMMWV)

Description. The HMMWV is a light, highly mobile, diesel-powered, four-wheel-drive vehicle that uses a common chassis. Using common components and kits, it can be configured as a troop carrier, armament carrier, shelter carrier, ambulance and TOW missile carrier. It is a tri-Service program that also provides vehicles that satisfy USMC, USN, USAF and foreign military sales (FMS) requirements. In Aug 05, a new variant of the HMMWV, the M1151 Enhanced Armament Carrier, will enter production and will replace the current M1114 UAH. The M1151 has UAH-like protection with a greater payload and incorporates operational lessons learned from OEF and OIF. An enhanced troop/cargo/shelter carrier M1152P1 is scheduled to enter production in Feb 06. The P1 designator reflects that armor has been installed on the vehicle. Additionally, the useful life of existing HMMWVs is being extended through an ongoing recapitalization program.

Program Status. There are 10,450 UAHs currently in U.S. Central Command's (USCENTCOM's) AOR supporting operational force protection requirements. Near-term production of HMMWVs (M1115P1/M1152P1/UAH) will support theater requirements as well as system interchange requirements for platforms such as Trojan SPIRIT, Tactical Operations Centers, Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T) and TUAV. Over 6,900 recapitalized HMMWVs are fielded in CONUS, including modularly converted units and SBCTs.

Heavy Expanded Mobility Tactical Truck (HEMTT)

Description. The HEMTT family of vehicles provides all-weather, rapidly deployable transport capabilities for resupply of combat vehicles and weapon systems. There are six basic configurations of the HEMTT series trucks: M977 cargo truck with Material Handling Crane (MHC), M978 2,500-gal

fuel tanker, M984 wrecker, M983 tractor, the M1120 HEMTT-LHS and M985 cargo truck with MHC. A self-recovery winch is also available on certain models. HEMTT-LHS provides the Soldier with an efficient and economical system with capabilities that cannot be replicated in the light and medium truck fleets. The HEMTT family of vehicles is designated as an FCS-complementary system and is a key enabler to achieving a distribution-based logistics system.

Program Status. All variants of the HEMTT are currently in production. The FY06-11 fielding schedule includes SBCTs 4-7, modular infantry and heavy BCTs, sustainment and fires brigades and OIF combat-loss replacements.

Palletized Load System (PLS)

Description. The PLS is composed of a prime mover truck with integral self-loading and unloading transport capability, a 16.5-ton payload trailer, and demountable cargo beds (flat racks). The vehicle can also be equipped with materiel-handling equipment and/or a winch. PLS is a key transportation component of the ammunition distribution system and provides long-range hauling, local hauling and unit resupply of ammunition. The PLS is capable of transporting multiple configurations of cargo utilizing a variety of flat racks. The M1077 and M1077A1 are sideless flat racks used to transport pallets of ammunition and other classes of supplies. The M1 flat rack carries identical classes of supplies. It is ISO/Convention for Safe Containers (CSC)-certified and is suitable for intermodal transport, including transport on container ships. Ammunition can be loaded on the M1 at depots, transported via container ship to theater, picked up by the PLS truck and carried forward without the use of any materiel-handling equipment. The PLS provides the Soldier with an efficient and economical system with capabilities similar to that of HEMTT-LHS, and is a major enabler in the Army's drive to achieve a distribution-based logistics system.

Program Status. The PLS is currently in production. The FY06-11 fielding schedule includes AC and RC engineer mission modules, APS and OIF combat-loss replacements.

Containerized Kitchen (CK)

Description. The CK integrates standard and commercial kitchen equipment into an expandable 8'x8'x20' ISO container. The CK has onboard refrigeration and uses the improved modern burner unit. The CK has a running water system and the interior is environmentally controlled. The CK can feed three meals a day to 800 Soldiers. Its efficiencies over the Mobile Kitchen Trailers (MKTs) include overall decreased footprint and manpower requirements.

Program Status. The CK has been in continuous production since FY02. Over 300 systems have been produced and fielded. Production continues at the rate of 4-6 per month through FY07.

Unit Water Pod System (Camel)

Description. The Camel system contains a 900-gal storage capacity, heater/chiller unit,

government-furnished M1095 (5-ton) medium tactical vehicle (MTV) trailer, and contractor-developed components mounted on or carried by the trailer. It will provide a maneuver company operating in a temperate environment 2+ days supply of water at a minimum sustaining consumption rate. It will have provisions for at least six retail dispensing points, and be fully capable of stand-alone operation. Camel will be capable of transporting both full and partial loads of water in accordance with approved OMS/MP standards by C-130 and larger aircraft, external-lift helicopter, and low-velocity, air-droppable means. Camel replaces the M107, M149 and M1112 series water trailers.

Program Status. The Camel ORD was approved in Mar 02, and the Camel entered testing summer 2005. Unit fielding is projected for 4QFY07.

Load Handling System (LHS) Compatible Water Tank Rack System (Hippo)

Description. The Hippo consists of a 2,000-gal, ISO-framed, potable water tank rack. The Hippo has an organic 125-GPM water pump, filling stand, 70-foot hose reel for both bulk suction and discharge and retail distribution. The Hippo will enhance water distribution by providing one system that enables both hardwall bulk water transportation and unit retail water support. It will allow for water transport directly from water purification points to supported maneuver elements and can be used as a water distribution point.

Program Status. Hippo will replace the majority of the Forward Area Water Point Supply System (FAWPSS). Fielding of the Hippo is projected for 4QFY07.

Load Handling System Modular Fuel Farm (LMFF)

Description. The LMFF provides the ability to rapidly establish a fuel distribution and storage capability at any location regardless of the availability of construction equipment or materiel handling equipment. The LMFF consists of 2,500-gal, ISO-framed, fuel tank racks and 400-GPM, ISO-framed, pumping modules. The pumping module will have a pump, engine, fuel/water separator, control panel, hoses, nozzles and other support equipment. The 35,000-gal capacity LMFF consists of 14 tank racks and two pumping modules. The 45,000-gal capacity LMFF consists of 18 tank racks and two pumping modules. The LMFF is compatible with the PLS and the HEMTT-LHS, allowing these systems to recover the tank racks and pumping modules, transport them to the new location, and emplace the system.

Program Status. ORD approved at the Department of the Army. Production verification test occurred in 4QFY04 and FUE in FY07. SBCTs will be the first units fielded the LMFF.

1,500-GPH Tactical Water Purification System (TWPS)

Description. The TWPS is a mobile water purification system capable of purifying, storing and dispensing water, meeting tri-Service field water quality standards for long-term consumption. Once emplaced, the system is intended to supply potable water, from a broad range of source waters, to ground, amphibious and airmobile units of the Army and

Marine Corps. It can also be used to provide potable water support to civilian agencies or host nations for emergencies, disaster relief, humanitarian efforts and peacekeeping missions. TWPS can purify up to 1,500 gallons of water per hour from any water source, including 60,000 total dissolved solids, salt water and NBC contaminated sources. The TWPS provides water support for division and brigade ground units operating in remote areas. It will be mounted on an LHS- or PLS-compatible flat rack and can be transported on a C-130 aircraft. Fielding may be delayed for units without LHS or PLS, pending availability of required LHS or PLS systems from production.

Program Status. TWPS began fielding Jun 05 in accordance with the Army Priority List.

Rapidly Installed Fluid Transfer System (RIFTS)

Description. RIFTS is a petroleum distribution system capable of rapidly deploying to distribute 875,000 gallons of fuel in a 24-hour day. Rapidly installed hose lines provide the ability to rapidly transfer fluid while decreasing traffic on main supply routes. RIFTS provides fuel distribution that is 10 times faster than the current Inland Petroleum Distribution System (IPDS). Procurement of RIFTS is conducted in two blocks. Block I includes development of the conduit (hoses), Employment Retrieval System (ERD) and auxiliary equipment. Block II includes the Automated Pump Stations (APS), Command and Control Module (C2M) with leak detection, computer-based planning aid and all auxiliary equipment.

Program Status. RIFTS Block I hose and reel fielding projected for late FY06 fielding. Block II pump stations and command modules fielding scheduled for early FY08.

Container/Material Handling Equipment (C/MHE)

Description. C/MHE includes all container and material handling equipment required to support the deployment of unit equipment and the distribution of sustainment items. The primary tactical C/MHE includes the Rough Terrain Container Handler (RTCH) and the All-Terrain Lifter Army System (ATLAS). The RTCH is the primary capability for handling 20- and 40-foot-long containers weighing up to 53,000 pounds. The RTCH is deployable by air, operates on all types of terrain, and is capable of stacking containers up to three high. The ATLAS has a 10,000-pound capacity and is capable of handling fully loaded 463L Air Force pallets, has a variable reach boom for removing items from 20-foot containers, and is capable of deploying by air.

Program Status. The RTCH program was terminated in FY04 with 342 of the 463 of the total AAO systems fielded. Production will restart in FY08. The initial contract production for ATLAS ended in FY05. A follow-on production contract for an upgraded ATLAS model is scheduled for FY07.

Maintenance Support Device (MSD)

Description. Formerly the Soldier Portable On-System Repair Tool (SPORT), MSD is a lightweight, rugged, compact, man-portable general-purpose automatic tester used to verify the operational status of systems, both electronic and automotive, and to isolate faulty components for immediate replacement. MSD is also used as a software uploader/verifier to restore or provide new software to weapon systems, and supports testing requirements of current and Future Combat Systems (FCS). The MSD and its predecessor, SPORT, are in wide use throughout the Army's ground

combat and CSS vehicle fleets as well as in the Army aviation fleet.

Program Status. MSD is currently being fielded. MSD V2 production begins Oct 05. A recent change in the basis of issue will provide the MSD to field-level maintainers at a ratio of 1:3 per maintainer occupational skill.

Man-Transportable Robotic System (MTRS)

Description. The MTRS provides a two-person, portable, lightweight robotic system capable of being helicopter transported, to give EOD Soldiers remote reconnaissance capability in situations where current robotics are too large to employ. Current operations have shown a need for smaller, portable robotic systems. Lack of this capability requires EOD Soldiers to physically approach explosive devices and manually perform reconnaissance and render safe procedures in confined spaces. Requirements for additional MTRS were initiated and validated in response to the increased threat and sophistication of potential threats.

Program Status. The new MTRS AAO of 461 incorporates additional requirements resulting from lessons learned in OIF and OEF. These requirements are included in the program plan through FY10.

Forward Repair System (FRS)

Description. The FRS is a high-mobility maintenance system designed to support forces in the battle area. FRS includes a crane and maintenance enclosure mounted on a component flatrack. The crane has a 5.5-ton lift capacity with a 14-foot (4.3 m) radius capable of removing and replacing major components, including full-up powerpacks (FUPPS) of all models of military vehicles.

The maintenance enclosure includes a 35 kW generator; air compressor; welding equipment including arc, acetylene and MIG; and industrial-quality air and electrical power tools ranging from 3/8- to 1-in drive with associated tool cabinets.

Program Status. FRS is in production and fielding. The units being fielded are BCTs undergoing modular conversion, SBCTs, as well as units in echelons above division.

Assured Mobility Capabilities

The engineer future force will be organized, manned, equipped and trained to be more strategically responsive, deployable, agile, versatile, lethal, survivable and sustainable across the full spectrum of military operations. The future engineer force structure will be comprised of modular, scalable and flexible organizations for prompt and sustained land operations capable of quickly transitioning between changes in task, purpose and directions.

Assured mobility capabilities support force application by maneuver forces as well as focused logistics by sustainment forces. A critical factor in sustaining operations is the ability of forces to move and to properly maneuver over the depth and breadth of the

battlefield while impeding, slowing or blocking our enemy's movement. Current operations in OEF and OIF highlight the enduring importance of systems that provide ground forces the capability of detecting, defeating and emplacing minefields and other obstacle effects, allowing unparalleled freedom of maneuver and force sustainment. This capability supports the commander's dominant maneuver capabilities that are critical to gaining the positional advantage needed to retain the initiative and enhance joint precision fires as well as ensuring sustainment force movement remains effective across the distributed battlefield environment.

Discussion of Key Assured Mobility Materiel Programs

AN/PSS-14 Handheld Standoff Mine Detection System (HSTAMIDS)

Description. The AN/PSS-14 is a handheld mine detector capable of detecting metallic and nonmetallic anti-tank (AT) and anti-personnel (AP) mines. It combines ground penetrating radar (GPR) and an improved metal detector to provide a high probability of detection and reduce false alarm rates. The system requires 40 hours of operator training and frequent refresher training due to the erosion of skills over time. The AN/PSS-14 will be fielded with a training set that includes a Sweep Monitoring System (SMS) and training targets.

Program Status. AN/PSS-14 entered low-rate production in FY03 and achieved Milestone C in 1QFY04. The program is projected to receive full material release in Jun 06. Available systems are fielded to designated engineer units currently deployed or soon to deploy in support of OEF and OIF.

Ground Standoff Minefield Detection System (GSTAMIDS)

Description. GSTAMIDS FCS is a time-phased developmental program designed to provide the warfighter a capability to execute on-route countermine missions for the FCS. GSTAMIDS FCS will be employed on an overpass-capable countermine MULE variant UGV. The system will employ future improvements that will automatically detect, mark and neutralize all metallic and nonmetallic AT mines.

Program Status. GSTAMIDS FCS will begin engineering and manufacturing development with project Milestone C in FY12.

Airborne Surveillance, Target Acquisition, and Minefield Detection System (ASTAMIDS)

Description. ASTAMIDS is a complementary program under the FCS program. ASTAMIDS is an ISR sensor payload for the FCS Class IV Fire Scout UAV. ASTAMIDS consists of a multi-mission/multi-mode sensor package that provides both day/night minefield and obstacle detection for assured mobility and RSTA/LD capabilities. The ASTAMIDS pay-

load provides high-quality, high-resolution digital imagery using fast, step-stare technology. Specific sensor technologies are a multispectral imager (MSI) using three visible and one near-IR spectral band, a mid-wave IR thermal imager (for a total of five geo-registered bands simultaneously), a color zoom camera, laser illuminator (to facilitate night or low-light operations), eye-safe laser range finder, laser designator, inertial measurement unit and a highly stabilized gimbal. Digital imagery is processed to automatically detect minefields and obstacles and to cue operators. In the RSTA/LD mode, the system can detect, recognize, identify and track combat targets and also laser designate these targets for munitions effects.

Program Status. The ASTAMIDS program is currently in SDD. ASTAMIDS is being managed by the Project Manager for Close Combat Systems (PM-CCS) in close cooperation with the PM-Robotic and Unmanned Systems (PM-RUS) and the PM-FCS (BCT) ISR. Contractor functional and qualification testing is planned for FY07 followed by contractor developmental test in FY08. Prototype deliveries of seven systems are synchronized with the needs of the FCS integration and testing efforts using three spiral builds during FY07 (two each), FY08 (two each), and FY09 (three each). A Milestone C/LRIP decision is planned for 2QFY09.

Route Clearance Vehicles

Description. Route clearance vehicles are a family of mine-protected vehicles employed by combat engineers in route clearance operations. The three vehicles are the Buffalo Mine Protected Clearance Vehicle (MPCV), the Interim Vehicle Mounted Mine Detector (IVMMD) and the RG-31 Medium Mine Protected Vehicle (MMPV). The vehicles are employed within a route-clearance team. The RG-31s provide local security to the teams and serve as command and control vehicles. The IVMMDs are used to detect mines or IED hazards, and the Buffaloes can investigate suspicious items with their hydraulic articulated arms. All three vehicles provide protection to the crew from explosive blasts and armor-piercing, small-arms fire. The Buffaloes also have RPG protection. Each vehicle is designed for rapid repair after an explosive encounter. All three vehicles are commercial items that have proven effective in wartime operations.

Program Status. The route clearance vehicles have been fielded in support of OEF and OIF. All three have AROC-approved capability production documents (CPDs) and the IVMMD CPD is pending approval. Milestone C for each is expected in FY07 pending funding and completion of full material release actions.

Intelligent Munitions System (IMS)

Description. IMS, an unattended munition within the FCS family of systems, is not only one of the first systems to be integrated into the FCS common operating environment (COE), it is also one of the first scheduled for fielding as part of Spin Out 1. IMS is a key capability in providing assured mobility by giving force commanders the freedom to move and maneuver where and when they want without regard to terrain, weather or other conditions.

IMS is a system of munitions, sensors and communication devices that can implement obstacle intent and attack targets, either autonomously or with man-in-the-loop control. When fielded, it will detect and neutralize enemy forces, cover gaps in dangerous terrain to prevent enemy maneuver, provide economy of force missions, protect fixed facilities and

secure flanks, allow for movement of friendly forces and provide for immediate selective engagement. The fully networked munition allows for a scalable response and provides ultimate flexibility for hand or remote emplacement on the dynamic battlefield.

IMS's ability to detect, classify, identify, track and engage selected targets fits into the FCS concept of providing our Soldiers with a system of systems that uses advanced communications and technologies to integrate the Soldier with families of manned and unmanned platforms and sensors.

Program Status. IMS is currently in the concept and technology development phase and projected to reach Milestone C in 1QFY09 and IOC in FY10.

Spider (Anti-personnel Land Mine Alternative (APL-A))

Description. The Spider APL-A is a compact, lightweight, hand-emplaced, AP munitions system designed to replace the M16 and M14 AP mines for Army and Marine use. The Spider is comprised of three main assemblies: a remote control system, a repeater and up to 84 munition control units (MCUs). Each MCU holds up to six miniature grenade launchers and is embedded with a GPS to provide accurate location to field components. The remote control unit (RCU) allows for man-in-the-loop, off-on-off and self-destruct capabilities via remote control. Additionally, Spider includes a munition adapter module that will initiate electric blasting caps and shock tubes to fire other lethal (Claymore, SLAM) and nonlethal munitions.

Program Status. Spider is currently in the SDD phase and projected to reach Milestone C in 2QFY06. LRIP will begin in FY06 and FRP in FY07. FUE is scheduled for FY07 and IOC in FY08.

Improved Ribbon Bridge (IRB)

Description. The IRB, fielded to multi-role bridge companies (MRBC), provides a dependable roadway or raft capable of crossing assault vehicles or tactical vehicles over nonfordable wet gaps. The capability of this system is military load classification (MLC) 100 wheeled and MLC 80 tracked. The bridge sections are transported by Common Bridge Transporters (CBTs). The CBT is a modified HEMTT LHS providing enhanced, multipurpose transportation capabilities. Each MRBC will have the capability of emplacing 210 meters of bridging. The system is external airlift transportable by CH-47 and CH-53 helicopters. The bridge bays are air transportable, partially disassembled, in C-130s. The IRB has enhanced capabilities of operation in swifter water speeds up to 10.3 feet per second and over 2.1 meter banks. It provides a 4.5 meter wide roadway, improved

hydrostatic capabilities and various other design improvements.

Program Status. A five-year, multi-year contract awarded in FY00 provided for 13 of 20 MRBCs with the IRB. Eleven units were fielded through FY05, with the remaining two units being fielded with the IRB in FY06.

Rapidly Emplaced Bridge System (REBS)

Description. REBS is a wheeled, vehicle-launched, bridge system providing a four-meter roadway width, MLC 30 tracked (T) and wheeled (W) normal and MLC 40(T)(W) gap crossing capability up to 13 meters. Transported on a CBT, each SBCT will have four REBS. This system is transportable by C-130 aircraft. The assembled bridge is externally sling lift-transportable by CH-47 and CH-53 helicopters. Two Soldiers can deploy the REBS in the daytime, within 10 minutes, with little or no site preparation.

Program Status. A five-year, multi-year contract was awarded in FY01 for 18 systems with an option for 22 systems. FUE is scheduled for 2QFY06.

Dry Support Bridge (DSB)

Description. DSB is a modular bridge assigned to the MRBC that can span a 40-meter gap and can be emplaced in 90 minutes by eight Soldiers. It significantly reduces the manpower and time needed to construct a tactical bridge as compared to current systems and possesses greater load capability. One bridge set provides either a 40-meter bridge or two 20-meter bridges. The bridge will cross MLC 96W/70T traffic and will allow the crossing of a heavy-equipment transporter carrying a combat-loaded M1 tank. DSB consists of a launcher permanently mounted on a PLS, three CBTs (for transport only, separately issued to unit) and four PLS trailers that carry the modular components as palletized loads. A bridge set consists of six M1077 flat-rack loads of bridge components, one M1077 flat-rack load of launch beams and a launcher vehicle. To transport and launch one complete DSB system requires the launcher, three CBTs and four PLS trailers.

Program Status. A five-year, multi-year production contract for 27 systems (base quantity) was awarded on 2 Sep 00. The total procured DSB systems for this contract was 32. The second five-year production contract was awarded on 4 Feb 05 for 26 systems with 100 percent call-up options. The DSB system is fully funded to procure the APO of 88 systems. Fielding initiated in FY03 will continue at approximately two MRBCs per year for systems funded.

Tactical Wheeled Vehicle Force Protection

As an important part of the Army's responsibility to sustain the Joint Force with equipment and directly related to the critical requirement to provide protection against an adversary's effect on that force, the Army has initiated an aggressive approach to protect its tactical wheeled vehicles. The highest priority is to provide such protection to our forces involved in ongoing operations in Iraq and Afghanistan, though integrated efforts will be both short and long term in their impact. To quickly address operational needs for armoring, the Army has established an armoring task force with the purpose of identifying requirements, developing an integrated strategy, determining ways to accelerate production and installation of armor solutions, determining funding solutions and identifying a longer-term strategy.

The Army has two distinct levels of armor protection that are being provided to tactical wheeled vehicles. The first, level I, refers to fully integrated armor installed during production and retrofit. The second, level II, includes officially approved and centrally manufactured add-on armor kits that can be installed on vehicles anywhere. Concurrently, the Army is assessing and testing other technological improvements to ensure that all tactical wheeled vehicles involved in operational missions are equipped with the best protection available.

Considerable effort as well as significant progress have been made since late 2003, when requirements for armored tactical wheeled vehicles were a few hundred. Under the auspices of the armoring task force, the pace of armoring has been accelerated in response to the rapidly changing operational requirements. As a result, as of Nov 05 over 35,601 vehicles had level I or level II armor installed, meeting theater requirements for armored tactical wheeled vehicles. Reaching this milestone has allowed the Army to transition to its long-term armoring strategy in which all new or rebuilt tactical wheeled vehicles will have an armor package integrated into them.

The Army has developed a strategy for addressing and funding these urgent requirements in the near term and sustaining it over the longer term. A summary of the key elements of the strategy, the current requirements and progress to date are shown in Figure D-9.

In addition to the essential materiel solutions to these operational requirements today, the Army is also fully involved in pursuing non-

Key elements of the tactical wheeled vehicle force protection strategy:

- Manage the apportionment of available up-armoring assets (kits, steel, ballistic glass and cabs) to ensure available assets are used in accordance with the supported commander's priorities.
- Strengthen manufacturing programs to ensure that each month we produce the maximum number of kits.
- Establish a forum (the Armoring Task Force) that links the supported commander (USARCENT), the force providers (FORSCOM, USAREUR, USARPAC), the materiel requirements and solution community (ASA (ALT), AMC, TRADOC) and HQDA to ensure that the Army plans and executes a synchronized program.
- Communicate the tactical wheeled vehicle (TWV) up-armoring program so that senior leaders across the Army have common visibility of the TWV up-armoring program.
- Priorities are determined by ground commanders based on mission and risk regardless of component.
- Develop a long-term, sustainable armoring strategy that incorporates operational lessons learned and provides armoring capability for all tactical wheeled vehicles.

Total Requirement:

- 9,727 for up-armored HMMWVs and 13,872 add-on armor kits for other HMMWVs.
- 9,497 kits for medium and heavy tactical vehicles.
- All level I and level II armored vehicles will remain in theater as stay-behind equipment.

Progress to date:

- Approximately 35,000 vehicles with level I or II armor in 24 months.
- Up-armored HMMWV (UAH) requirement met in Jul 05. UAH production will continue to flow into theater to upgrade level II armored vehicles.
- Production for validated kit requirements completed in Sep 05.
- Installation of all vehicle kits completed in Dec 05.

Figure D-9. Tactical Wheeled Vehicle Force Protection

materiel measures that can directly improve the sustainment and protection of the Joint Force. These steps include the work of the JIEDD task force, which is working across the interagency and international spectrum on materiel and nonmateriel solutions to defeat this threat. Tangible results include effective countermeasures, fielding systems that increase detection and enhance detonation, and training solutions that increase awareness and incorporate lessons learned. In the end, this is and will remain a high-priority task for the Army and one that is fully integrated into equipping and operational requirements and responses.

Focused Logistics (FL) Summary

Sustainment of forces, in any environment, is critical to successful mission accomplishment. This appendix focused on the systems critical to the logistics triad: unity of effort, domain-wide visibility, and rapid and precise response. More important than materiel programs, however, is the entire redesign of the Army's force to a future combat force design and the accompanying logistics transformation effort. This new design will greatly enhance the Army's ability to rapidly deploy and successfully carry out missions across the full spectrum of operations.

As the Army continues to transform itself into a future force design, the specific requirements needed to enhance mobility and sustainability will become clearer. The current plan funds those programs with proven potential for the future while enhancing the capabilities and readiness of the current modular force.

Appendix 4: Battlespace Awareness (BA)

Battlespace awareness is the ability to sense and understand the operational environment with its mix of friendly "blue" forces, enemy "red" forces and nonaligned actors/noncombatants, as well as the "white" aspects of terrain and weather aspects that can aid or hinder friendly force operations. BA relies on the continuous collection, processing, fusion, analysis and modeling of data from a large mix of highly responsive sensors (e.g., unattended, human, intrusive and remote) to provide the commander and his force elements with near real-time, collaborated, tailored, actionable battlespace information. Enhancing BA capabilities provides the commander with more confidence in his understanding of the operational environment and the associated operational risks. This translates to better and faster decision making in the planning and execution of operations. BA is the key to increasing the reach, persistence and agility of our military capabilities while increasing the range of military options available.

Observation and information collection occurs throughout the battlespace from traditional ISR sensors and collectors, such as satellite constellations, airborne and proximate sensors, HUMINT, sensors specifically designed to support weapons systems (e.g., Firefinder), to nontraditional sources, such as commercial and open sources. Each of these entities represents a node in the BA grid. Nodes provide data and information to the grid and draw information as required from the grid. Nodes range from every Soldier in the field as a potential sensor to the future space-based radar, as a primary provider of an extremely fine-grained depiction of the battlespace. Through these nodes, intelligence on current and future activities in the operational envi-

ronment and updated baseline environmental information is collected, fused, analyzed and presented to create a comprehensive battlespace picture. Baseline environmental data includes information on the weather, cloud cover, vertical temperature profile, humidity, wind, precipitation, soil moisture, ice cover, sea ice, electron density profile, vegetation, terrain, infrastructure, resources (e.g., water, energy sources, building materials), transient infrared sources, second-order effects such as trafficability and sensor field of view; and significant social aspects such as the cultural, religious, economic, political and security situation. By utilizing the collection capability of all possible nodes, the reach, robustness and persistence of the entire sensing network are greatly enhanced to create a pervasive, detailed understanding of the battlespace.

One significant area of joint development that supports enhanced BA capabilities is space. Space is the backbone for the national and military ISR architecture and the domain of choice for commercial broad-area sensing enterprises with military utility. Space-based communications provide reach and NLOS connectivity while space-based ISR and commercial imagery platforms substantially enhance strategic, operational and tactical intelligence collection, processing and dissemination. Soldiers in OEF and OIF use space-based systems to communicate, navigate, target, find and fix the enemy, anticipate weather, receive missile warning, avoid fratricide and much more.

The Tactical Exploitation System (TES) embedded in the corps and division force structures is providing vital space-based and airborne imagery, signals intelligence (SIGINT), BFT and communications reach to and from deployed units for OIF. The Army is currently developing the Distributed Common Ground System-Army (DCGS-A), as part of the DOD DCGS family of systems concept, to incorporate ISR data and information from all sensors and analytic centers, regardless of the source. It will provide the red and gray weather and environment portions of the COP to commanders and decision makers down to the individual Soldier.

The shared visibility between operations and intelligence provides the venue to predict the effects of threat actions and changes in the operational environment as well as assess potential courses of actions against the threat operations. Decision making and forecasting tools will continuously evaluate changes in environmental data to identify potential impacts on ongoing operations and alert the relevant decision authority to the perturbation. Predictive analysis and modeling will allow potential courses of action to be evaluated with a better understanding of the potential impacts on the operational environment. The simultaneous current and forecasted depictions of the battlespace, coupled with the responsiveness of sensors, will allow commanders to quickly evaluate sensor mission utility and retask multiple sensors to react to emerging operational situations.

Current and projected operational information will be continuously fused by robust knowledge management systems and disseminated to all levels of users through adaptable, flexible, networked communications systems. Within this “producer interactive network,” force elements will subscribe to products or data (including archival data). Software agents will broker data and products, posting some unprocessed information. In this manner, all joint, allied and coalition warfighters will have access to common data, within security access and transport layer constraints, to construct their own tailorable, relevant operational pictures. Access to the combat

support agencies' data is key to achieving dominant battlespace awareness.

Discussion of Key Battlespace Awareness Materiel Programs

Distributed Common Ground System-Army (DCGS-A)

Description. DCGS-A is a family of systems and an integral component of the Army's ISR networking strategy. DCGS-A will migrate capabilities of disparate ISR systems into a joint, common, interoperable multi-intelligence architecture to improve the ground commander's ability to act faster than the enemy's decision cycle, or ability to react. DCGS-A software/hardware used throughout the Army and joint environments will task, post, process and use Army, joint, national, interagency and multinational ISR sensor data and information in support of future Army, joint task force and multinational operations. DCGS-A is an FCS complementary system, providing the threat, weather and terrain data to the BCT through its embedded software capabilities. Fixed and mobile DCGS-A transparently operates with embedded DCGS-A software applications within the FCS, operating in a secure, collaborative, networked environment. DCGS-A provides real-time, sensor-to-commander, sensor-to-shooter, and sensor-to-analyst information tailored to mission, task and purpose of the recipient. DCGS-A also provides the ground station for the Aerial Common Sensor (ACS) and UAVs. It is part of the larger DOD DCGS family of systems and will meet the requirements of the DCGS integrated backbone, net-centric enterprise services, and system of systems COE.

Program Status. The DCGS-A program will employ an evolutionary acquisition strategy, providing incremental milestone decisions throughout the SDD phase based on validated/approved requirements for DCGS-A capabilities and the DCGS-A capability needs inherent in other future force programs such as the ACS and the FCS. Milestone B decision is scheduled for 2QFY06 to field an objective capability by 2010. The 525th MI Brigade, XVIII Airborne Corps, demonstrated a DCGS-A capability in FY04. The DCGS-A program demonstrated a mobile prototype for Joint Expeditionary Force Experiment (JEFX) 05 and FCS 1.1 and will provide limited enhanced capabilities to OIF by FY06 with the transition of Joint Intelligence Operations Capability-Iraq (JIOC-I) into the program of record.

All Source Analysis System (ASAS)

Description. ASAS is the Army's primary intelligence fusion program, found at all Army echelons from battalion to field army. It automates the planning and management of intelligence, counterintelligence and electronic warfare operations; intelligence collection management; the processing and analysis of intelligence and combat information; and the dissemination of intelligence and combat information products to tactical and operational commanders. ASAS provides an automated interface to the Army Battle Command System (ABCS) and the Joint Global Command and Control System. These interfaces provide battlefield commanders with enhanced

situational awareness and timely intelligence on enemy force deployments, capabilities and potential courses of action, as part of the COP. In turn, the Army intelligence community receives current information on blue force locations, activities and plans. As the Army begins to fuse intelligence and operations, ASAS provides the initial automated intelligence capabilities required for this enhanced command, control and intelligence support. These capabilities will be merged into the DCGS-A program.

Program Status. With a favorable Milestone C decision in Jun 05, ASAS Block II is in FRP. Three ASAS Block II analysis and control elements (ACE) will begin operating in Iraq in FY06 in support of a corps and two divisions. Currently, the Army is fielding Block II ASAS Light intelligence staff support systems and BCT ASAS analysis and control team elements to the force.

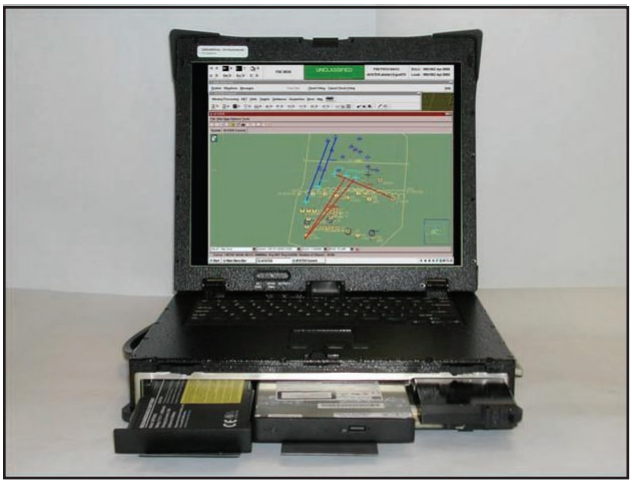
Aerial Common Sensor (ACS)

Description. ACS is the Army-led, joint airborne ISR system that meets the Army and Navy's requirements for a worldwide, self-deployable asset that can begin operations immediately upon arrival into theater, in front of, or alongside the Joint Force. ACS will support the theater down to the BCT commander and will merge and improve the capabilities of Guardrail Common Sensor and Airborne Reconnaissance-Low into a single multifunction platform to provide the requisite networked situational awareness and joint network-centric and deep-strike precision targeting for the future Joint Force commander. ACS provides multi-intelligence precision targeting and distributed, wide-area, persistent surveillance throughout the breadth of the joint operations area battlespace. Using the DCGS for the ground station component, ACS, via robust sensor-to-shooter and reach links, will provide commanders at every echelon with the tailored, multisensor intelligence required for dominant maneuver, precision engagement, information superiority and decision dominance throughout a nonlinear framework and noncontiguous battlespace. Onboard battle command and communications relay packages with the ISR payload will ensure uninterrupted, joint integrated C4ISR support to the maneuver commander across the spectrum of conflict and through all phases of the battle. ACS's modular, open architecture, with onboard SIGINT, imagery intelligence (IMINT) and measurement and signature intelligence (MASINT) subsystems, fuses the EO, IR, synthetic aperture radar (SAR), moving target indicator (MTI), multi- and hyperspectral imagery sensors to provide a single multi-INT view of the threat. The ACS teams off-board analysts with onboard battle command, communications relay and intelligence functions for a robust multipurpose system that enables the commander to see first, understand first, and finish decisively.

Program Status. The Army terminated the ACS contract with Lockheed Martin for convenience on 12 Jan 06. The contract, awarded 2 Aug 04 as a SDD contract, has been in a Stop-Work status since September 14 Sep 05, when the Army gave Lockheed 60 days to propose alternative options to resolve ongoing issues with devolving program requirements. It is important to note that the Army did not terminate the ACS program, only the contract. ACS capabilities remain valid requirements for both the Army and the Navy. The ACS system will provide an order of magnitude improvement over the DOD current fleet of ISR aircraft. In the meantime, the OSD will begin a 6-month joint ISR study in Jan 06 aimed at determining the right mix of manned and unmanned systems across all three Services that would meet the DOD's future airborne ISR requirements. The Army

will use the results of this study to further define its own requirements and acquisition strategy for ACS, and work towards re-competing and restarting the ACS development contract in 2009.

Advanced Field Artillery Tactical Data System (AFATDS)



Description. AFATDS is the primary Army fire support system that provides tactical and technical fire solutions, including weapon-target pairing, mission planning and execution. AFATDS provides the fires COP at each echelon, as well as the technical fire control providing ballistic solutions for cannons and rockets. AFATDS is a true joint system: fully fielded by the USMC, on USN ships, and interoperating with the USAF via the Air Force's Theater Battle Management Core System. As such, AFATDS provides a full range of situational awareness, battle management, planning, and target analysis and engagement capabilities for the employment of all supporting arms and assets.

AFATDS operates from platoon to echelons above corps, providing a tactical and operational picture of the battlefield to meet the commander's top seven priorities. AFATDS provides the friendly picture of the location and status of all friendly fire support assets; the enemy situation, including tracking all enemy target locations; and a running fire support logistics status (e.g., propellants, projectiles, fuzes). AFATDS provides graphic control measures, maintaining a complete database of fire support geometries and fire support coordinating measures (FSCMs), and performing appropriate levels of coordination as required. The AFATDS target database and weapon status-tracking feed the commander's situation report. AFATDS management of the FSCM and capability overlays ensure optimal weapon target pairing and strategic attack analysis.

Program Status. AFATDS is currently fielded to 11 USN ships, 100 percent of USMC units, 100 percent of the active Army units and 75 percent of the ARNG units. Version 6.3.2 software is currently in use and is in the process of replacement by version 6.4 in 2005. Recently identified by OSD as completely interoperable with net-centric requirements (as they are currently identified), future developmental improvements will focus on increased joint interoperability, and new weapons and munitions functionality.

Long-Range Advanced Scout Surveillance System (LRAS3)

Description. LRAS3 provides unmatched long-range target acquisition and far target location capabilities to armor and infantry

scouts. It consists of horizontal technology integration (HTI) second-generation FLIR (cooled infrared), long-range optics, laser range finder, GPS interferometer, day video camera, and a link to FBCB2 for automated handoff of target locations. As the premier ground scout sensor system, it enables the scout and cavalry units to conduct RSTA missions while remaining outside threat acquisition and engagement ranges during all-weather and dirty battlefield conditions (i.e., fog, dust, smoke and sand). LRAS3 is also being integrated with a laser designator module (LDM) as the Fire Support Sensor System (FS3) for the Stryker Fire Support Vehicles and the Knight Fire Support Vehicles.

Program Status. LRAS3 is in FRP, and LRAS3 procurement is funded for both AC and RC heavy and infantry BCTs. LRAS3 is being fielded to HMMWV-mounted scouts and is being integrated into the Stryker Reconnaissance Vehicles.

Tactical Exploitation System (TES)

Description. The TES family of systems is the Army's Tactical Exploitation of National Capabilities (TENCAP) system that receives, processes, exploits and disseminates intelligence data from direct downlinks and other fixed and mobile ground stations. The TES family of systems is a key part of the emerging DCGS architecture with TES variants in Army, USN, USMC, limited USAF units, and selected national and joint agencies/headquarters. TES software and middleware are the basis for DCGS-A fixed systems. The TES program combines the intelligence functions of four previously stovepiped ISR collection systems into an integrated downsized, open, scalable, modular and network-centric architecture with all elements fully transportable by C-130 aircraft. TES tasks, receives, processes and exploits electronic intelligence (ELINT), communications intelligence (COMINT) externals, IMINT and MTI data from satellites, Air Force and Navy theater aircraft/sensors, and selected tactical aircraft/sensors from Marine Corps and Navy. TES generates timely information, intelligence and targeting data. TES also is capable of limited MASINT processing and analysis. TES receives space-based binary file transfer (BFT) data and provides it to the GCCS Army. TES has a direct digital/network interface with the AFATDS, Automated Deep Operations Coordination System (ADOCS) and the JIOC-I. TES performs preprocessor, processor and analytical functions for the ASAS, Common Ground Station (CGS), JIOC-I, and Digital Topographic Support System (DTSS). Designed for split-base operations, TES supports joint, combined and early-entry operations.

Program Status. TES-Main and TES-Forward systems have been fielded to 18th Airborne Corps, V Corps, III Corps and 513th MI Brigade. As the Army transforms to its new structure, the TES-Main will support the theater as a component of the theater intelligence brigade (TIB) and the TES-Forward will be organic in both the corps and selected TIBs. Distributive-TES (DTES division-level assets) have been fielded to all AC divisions. These will become organic to the division. Three more DTES will be produced and fielded over FY06-07 for the corps (three-star tactical command posts). The TES-Forward (minus) system will be fielded to the 501st MI Brigade and to I Corps in FY06. Twenty-one TES-Light systems will be fielded to SOF, ACR, Republic of Korea Army and selected BCT elements in FY05-06. The JIOC-I has been fielded to Multinational Forces-Iraq command center. The TES Remote Interface System (RIS) that provides expanded direct database access between TES/DTES and ASAS has been fielded to VXIII Airborne Corps 4th ID and as stay-behind equipment in

support of Multinational Corps-Iraq (MNC-I). A number of TES systems continue to be deployed in OEF and OIF and judged in after-action reports as being very supportive of high operating tempo (OPTEMPO), ISR and dynamic targeting demands. TES systems were/are the primary source of theater and national near real-time imagery and SIGINT data for MNC-I and divisions. TES software and middleware are the bases for the DCGS-A fixed that have been fielded to 513th (3rd Army) and 501st (8th Army) MI Brigades. By Jan 07, the DCGS-A fixed will be fielded to the 500th (USARPAC) and 66th MI Brigades. TES systems will be in the force structure until the objective DCGS-A system is fully fielded, sometime after 2015.

Integrated Meteorological System (IMETS)

Description. IMETS supports the current force, including aviation, SOF and SBCTs, and the transformation to the modular design. It will migrate through spiral development to DCGS-A in the future modular force in 2008. IMETS ingests local aviation surface weather and artillery upper observations, weather satellite data, and observations from unattended, automated observing equipment. IMETS receives transmissions of centrally prepared USAF forecast products. IMETS uses Army weather effects software linked to current and forecast data to determine weather effects on friendly and enemy personnel, equipment and operations. IMETS provides tailored weather forecasts and space weather impacts for planners and operations, including chemical defense. Weather effects are linked to users within each supported tactical operations center (TOC) by direct machine-to-machine interface, enabling users to interact with the database to determine details on adverse weather effects. IMETS is the gateway and communications interface to support major subordinate commands and warfighters without direct weather support.

Program Status. IMETS is primarily an NDI that will have three distinct configurations: vehicle-mounted, command post (CP) and light. The vehicle-mounted and light configurations are in FRP. The IMETS objective software applications underwent testing in 4QFY04, with fielding initiated in FY05. This is the hardware and software baseline that will support ABCS 6.4 and provide the bridge until DCGS-A and FCS integrate the capabilities.

Trojan Special Purpose Integrated Remote Intelligence Terminal (SPIRIT)

Description. Trojan SPIRIT provides assured Top Secret/Special Compartmented Information (TS/SCI) satellite communications to deployed warfighters from brigade to echelons above corps. It provides critical intelligence reach to strategic, operational

and tactical Army and joint formations. Trojan SPIRIT was born as a quick-reaction capability during Operations Desert Shield/Storm, as commanders needed a way to receive time-sensitive Top Secret and Secret imagery and intelligence data at high data rates. From those beginnings, the system became a program of record in 1993, designated the Trojan SPIRIT II, with initial fieldings to separate brigade/ACR, division, corps, and EAC units. Trojan SPIRIT II fielding ended in 1998, but the advent of the Stryker brigade brought the system back to life with a new variant, the Trojan SPIRIT Lightweight Integrated Telecommunications Equipment (Trojan SPIRIT LITE). There are three versions of the Trojan SPIRIT LITE: a transit case version (V1), in use by Special Operational Forces, and two wheeled versions (V2/V3) used at the BCT through EAC levels. All feature a 2.4 meter satellite dish which provides up to T-1 (1.544 mbps) throughput using the C or Ku frequency bands. Each Stryker brigade receives two V2 and one V3 Trojan SPIRIT LITE. Under the modular force design, each BCT receives one V3 system, a significant increase in Trojan SPIRIT density across the force. The new divisional headquarters retains the two Trojan SPIRIT II systems formerly in the division MI battalion, and fielding of a third system (a LITE V3) is under consideration.

Program Status. The program is beyond Milestone III. The Trojan LITE V2 and V3 have been in production since FY00. LITE V2 production will cease in FY07 after fielding of Stryker Brigade 7. LITE V3 production and fielding will continue through FY11 as the Army resources all modular force brigades and National Guard Division Headquarters with the system. The Trojan SPIRIT ORD was revised and AROC approved in Dec 03, and is in the final stages of joint staffing and approval. Trojan SPIRIT is an interim solution for assured TS/SCI satellite communications until the fielding of Warfighter Information Network–Tactical (WIN-T).

Prophet

Description. Prophet provides a near real-time view of the BCT/ACR/SBCT area of operations through the use of SIGINT sensors, and includes the capability to detect, identify and electronically attack select enemy emitters. It is a dedicated, dynamically retaskable asset, allowing the tactical commander to visually depict and understand his battlespace, now and in the future. It provides expanded frequency and area coverage for situational development and awareness, as well as force protection operations. Prophet can operate on-the-move, mounted on a HMMWV, or stationary in a mounted or dismounted configuration. It has an open architecture that supports programmed improvements and mission-specific technical insertion components. This makes Prophet relevant throughout the entire spectrum of operations and able to exploit critical high-value emitters. Prophet has been an invaluable and critical collection asset in the global war on terrorism.

Program Status. Prophet Block I began fielding in Nov 02 and was fielded to all deploying forces in support of the global war on terrorism. Prophet Block II is in LRIP, and the first systems will be available for fielding in late FY06. In response to the global war on terrorism, the Army will also begin fielding an

interim Block III capability in late FY06. The production version of Block III continues in SDD and is expected to undergo IOT&E in FY07 with FUE in FY08.

Tactical Unmanned Aerial Vehicle (TUAV) Shadow 200

Description. The RQ-7A Shadow 200 TUAV provides the maneuver commander with a near real-time, highly accurate, sustainable capability for over-the-horizon RSTA, and battle damage assessment (BDA). Each Shadow 200 TUAV system consists of four Shadow 200 air vehicles, six HMMWVs, two ground control stations (GCS), one portable GCS and four remote video terminals that can provide near real-time video to commanders on the ground. The Shadow 200 TUAV has an onboard EO/IR sensor payload. Future planned improvements include a laser designator, a tactical common datalink for secure, jam-resistant data forwarding, and an upgrade of the engine to gain reliability improvements. The threshold range is 50 km with an objective range of 200 km and an on-station endurance of four hours. The threshold payload is 60 pounds with an objective capacity of 100 pounds. OPTEMPO requires a threshold of 12 hours per 24-hour period and an objective of 18 hours per 24-hour period.

Program Status. TUAV IOT&E was completed in May 02 followed by a Milestone III FRP decision in Sep 02. FUE was 3/2 IN SBCT in May 02 and IOC was achieved in Oct 02. Production and fielding continues under the FY07-11 program plan. The TUAV is currently supporting the global war on terrorism. The TUAV program was revalidated by JROC in 2004.

Counterintelligence/Human Intelligence Information Management System (CHIMS)

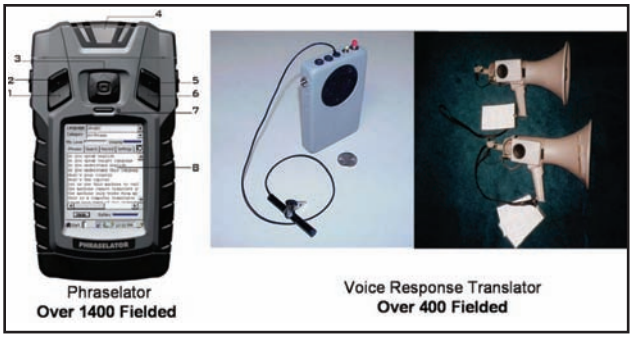
Description. CHIMS provides counterintelligence (CI) investigator/interrogator and HUMINT agents/Soldiers with automation support for the collection, analysis, production and dissemination of HUMINT and CI data/information. CHIMS provides the Army commanders at all echelons down to the BCT and Joint Interrogation and Detection Centers (JDIC) with automation for the collection management, analysis and production of CI and HUMINT data into actionable

intelligence. It is designed to support the commander's ability to anticipate and react to a wide range of force protection threats and situations. The system is message and reporting interoperable with the Army ASAS at the tactical level with planned enhancements to be interoperable with the Portico program and the Defense Counterintelligence Information System (DCIIS) at the strategic level. The Biometric Automated Tool (BAT) system that has evolved out of OIF and OEF has been integrated into the CHIMS software to capture and store fingerprints, facial recognition and

iris scan algorithms for HUMINT data fusion and correlation of detainee, employee and refugee tracking during stability and support operations (SASO). CHIMS also provides the capability of document exploitation (DOCEX) for the screening/triage in over 40 languages with planned Arabic-to-English audio and visual look-up enhancements.

Program Status. CHIMS is a spiral development effort with Version 4.2 currently in FRP with all procurement in direct support of OEF and OIF. The software in the SDD phase is planned for integration into the DCGS-A Spiral Four initiative and should start production in FY06.

Sequoyah Foreign Language Translation System (S-FLTS)



Description. Military, contract and host nation linguists provide a critical capability that is unavailable in sufficient numbers to satisfy the language translation needs of the Army or the joint operational environment. The S-FLTS addresses this capability gap by enabling non-linguists with two-way automated speech and text cross-lingual communication capabilities on demand. S-FLTS will provide commanders an organic capability to rapidly perform two-way speech and text cross-lingual operations across all echelons and in all environments where linguist support is minimal or unavailable. S-FLTS' interoperable design will enable it to be embedded on diverse platforms throughout the joint community to include the BCS, GSS, FCS and the DCGS. S-FLTS cross-lingual capabilities will be available via a browser, and as modules for systems that are not always linked to the network (mobile and handheld computers).

Program Status. The Army has been designated as the lead Service for S-FLTS with JROC interest designation. The S-FLTS ICD received JROC approval on 13 Jun 05. Joint Forces Command (JFCOM), in response to an Urgent Need Statement provided by the Multi-National Security Transition Command-Iraq (MNSTC-I) is developing the initial speech to speech (IS2S) capability by leveraging off DARPA's tactical translation effort. The First Spiral IS2S prototypes are currently being assessed for their system and operational performance. It is anticipated that the Third Spiral (Feb 06) will produce systems that provide military utility and will transition to S-FLTS to establish the foundation system to build upon. Additionally, the Army intends to establish S-FLTS as a program of record for the FY08-13 program planning period.

Battlespace Awareness (BA) Summary

BA supports and is supported by the other functional concepts. BA enables JC2, force application and force protection to bring combat power to bear at critical points, avoid enemy denial and deception, breakthrough or circumvent anti-access and area-denial strategies, and thwart enemy attempts to harm U.S. interests worldwide.

BA capabilities strive to achieve superior situational understanding of the threat and battlespace; decision superiority using precision actionable intelligence to achieve desired effects rather than physical destruction alone; integration of multifunctional tactical, theater, and national intelligence sensors and sources; precision targeting and armed aerial

reconnaissance; and denial of enemy access to friendly information.

Recent operations have shown the value of space-based, airborne and ground C4ISR systems that are networked with manned ground systems to achieve Joint Force BA capabilities. The Army is developing organizations and fielding equipment to capitalize on this operational experience in today's force as well as in the building of tomorrow's force with future Joint Force BA capabilities.

Appendix 5: Command and Control (C2)

C2 is the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. As defined by FM 6-0, C2 consists of the arrangement of personnel, information management, procedures, equipment and facilities essential for the commander to conduct operations. To accomplish this effectively, the commander fuses battlespace information with information on force locations and capabilities, as well as other information relevant to mission planning, into a shared situational awareness (Blue, Red, and Grey to include combat identification) that is displayed on a tailorable COP. The commander develops alternative plans of action, selects a course of action and directs force employment exercising C2. The military and rapid decision-making processes as part of the overall C2 allow for preparation of a campaign or battle and for response to battlefield opportunities or challenges. Key elements of C2 are a decentralized, networked and collaborative communications and computer environment that provides the precision guidance and timing capabilities that collectively support accelerated decision-making processes throughout the Joint Force. The synergy of this collaborative environment with the COP allows subordinate commanders to self-synchronize their activities, based on knowledge of the commander's intent and of the current situation in battlespace, and to execute actions seamlessly, with minimal or no requirements for deconfliction or coordination.

Army C2 is a critical enabler for and a fully interoperable component of JC2. Army C2 is an enabler for battle command, which is the execution of command against a hostile, thinking enemy (FM 6-0). JC2 joint concepts and Army battle command concepts are complementary and commander-centric. The C2 Joint Integrating Concept (JIC) capabilities are exercise command leadership; establish and adapt command structures and enable both global and regional collaboration; develop and maintain shared situational awareness and understanding; communicate commander's intent and guidance; plan collaboratively; synchronize execution across all domains; monitor execution, assess effects and adapt operations; and leverage mission partners. Both are focused on achieving better situational understanding and decision dominance.

Army C2 will interoperate seamlessly in the Joint Force and environment. Commanders must be able to exercise effective C2 of an interdependent Joint Force in rapidly changing scenarios involving complex distributed, simultaneous or sequential operations often with other agencies and nations. Commanders must effectively integrate disparate capabilities from a variety of sources into a cohesive force. Commanders must rapidly achieve coherent, decisive effects against a variety of adversaries, exploiting information superiority and taking the offensive whenever practical. Commanders must be prepared to make decisions in a volatile, uncertain,

complex, ambiguous environment against irregular, catastrophic, disruptive and conventional threats. Commanders must be able to conduct robust collaborative planning (e.g., develop and assess multiple courses of action and/or branches and sequels) under severe time constraints. Commanders will need to exercise the core functions of C2 anytime and anywhere in degraded network environments and from austere as well as robust fixed sites, from mobile sites (i.e., on the move) and in transition between sites. Commanders must communicate, collaborate and monitor joint and combined operations in a highly decentralized environment. Commanders must maintain unity of command within a joint and/or combined force and unity of effort with mission partners.

To properly support and sustain the commander's intent on the battlefield, the COP must also provide information from the common operating logistics environment (CLOE) that enables timely and accurate logistics readiness information and sustainment requirements to both operational warfighters and logistics managers. Army C2 will be in consonance with the transformation of Army logistics capabilities. These logistics capabilities must support operations that are continuous and distributed, across the full range of military operations. The future logistics system will be characterized by a net-centric, distribution-based, anticipatory, demand-driven, performance-based approach to the joint logistics enterprise. The central idea of focused logistics is to build sufficient capacity into the deployment and sustainment pipeline, exercise sufficient control over the pipeline from end to end, and provide a high degree of certainty to the supported Joint Force commander that future joint forces will receive the right support, at the right place, at the right time, and in the right quantities, across the full range of military operations. Although still in a conceptual exploratory phase, adaptive logistics is a capability to provide key aspects of the sense and respond logistics (S&RL) vision in a manner to create situational understanding and actionable information where none previously existed.

The concept of S&RL relies upon highly adaptive, self-synchronizing and dynamic physical and functional processes, employing and enhancing operational cognitive decision support. The S&RL concept predicts, anticipates and coordinates actions that provide warfighting advantages spanning the full range of military operations across the strategic, operational and tactical levels of war. S&RL lets logistics support more closely conform to unfolding battlefield conditions, while remaining intimately connected to a commander's intent, thereby enabling more fluid operations and creating an ability to seize local opportunities as they develop. It requires a network-centric enterprise and disciplined collaboration within and across communities of interest. Synchronizing the logistician's decision cycle to that of the warfighter enables a logistics system that is focused on the effect a given action in the logistics domain will have on the warfighter planned or executing intent. The end state is for logisticians to operate within the construct of a global, end-to-end joint distribution enterprise that synchronizes and integrates all elements of the logistics system to ensure consistent, reliable and predictable support to the Joint Force commander's concept of operations, in which speed and flexibility are the most demanding battlefield requirements.

A future enabler to S&RL is the use of micro-electrical mechanical systems and nano-technologies, with built in asset "health" monitoring, reporting and alert features. Using asset tracking and integrated micro-sensor capabilities in conjunction with C2 systems

will help enable focused logistics support by providing more timely and accurate information on the location and viability of assets. Moving forward with exploration and experimentation with advanced sensor technology capabilities will provide logisticians a unique opportunity to transform logistics, engaging necessary support actions when and where they are needed, while improving overall lifecycle management. As part of transformation, logisticians will be able to track and gain alerts specific to time-critical events. With improved asset visibility, logisticians can provide more timely and proactive management of assets relative to the environment, unique characteristics, handling, and operational protocols.

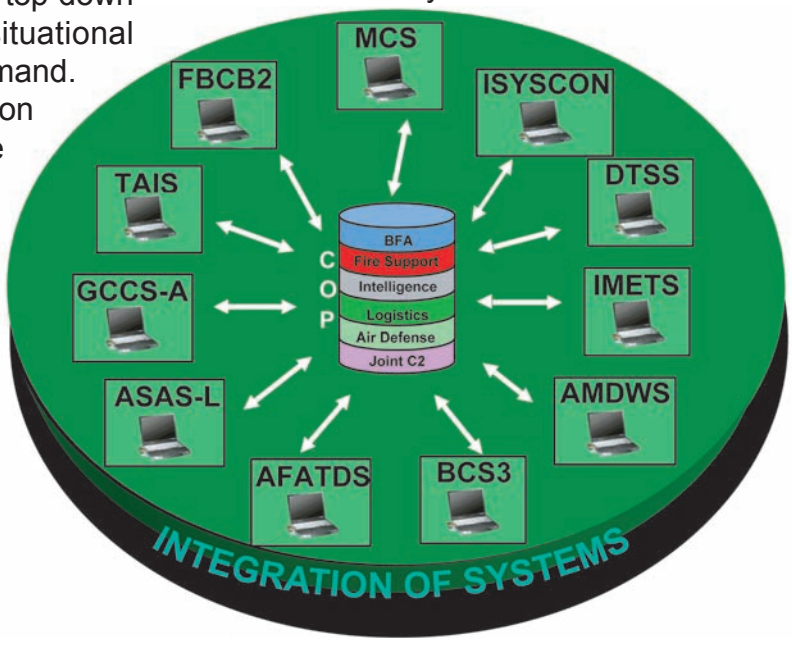
Battle Command

The Army views battle command, the art and science of applying military leadership and decision making, as the essential capability that enables the conduct of current and future joint operations. Enabled by C4ISR, battle command enhances the commander's ability to gain information and decision-making advantages over any adversary. Further, C4ISR networks within the Global Information Grid (GIG) will provide an inherently joint, top-down network that provides common situational awareness to improve battle command. Army battle command modernization efforts are designed to bridge the current to future forces, enable network-enabled battle command, and allow the operational and tactical commander to see first, understand first, act first, and finish decisively with unprecedented situational understanding and decision superiority.

Discussion of Key Command and Control Materiel Programs

Army Battle Command System (ABCS)

Description. ABCS is the Army's component of the Global Command and Control System (GCCS) and Combatant Commander deployment C2. It is a complex system of systems that receives and transmits information among the Joint Force. ABCS consists of subsystem software that provides specific support for the battlefield functional areas, including Global Command and Control System-Army (GCCS-A), Maneuver Control System (MCS), Air and Missile Defense Workstation (AMDWS), Force XXI Battle Command Brigade and Below (FBCB2), All Source Analysis System-Light (ASAS-L), Advanced Field Artillery Tactical Data System (AFATDS), Integrated Meteorological System (IMETS), Digital Topographic Support System (DTSS), Battle Command Sustainment Support System (BCS3), Integrated Systems Control (ISYSCON) and Tactical Airspace Integrated System (TAIS). Additionally, common software products enable information sharing with other systems and provide situational awareness of the battlefield to every echelon.



Program Status. The Army has reassessed the ABCS software and will conduct an operational test and evaluation (OT&E) for ABCS 6.4 in 2QFY05. The new baseline software will be used on all ABCS systems. ABCS 6.4 will maintain a joint interoperability with other Services at the division level and above, while still providing the COP at division and brigade levels within Services. The test will also assess the current distribution and sustainment strategy to see what initiatives can take place in order to further promote ABCS interoperability across the Army and within the Joint Force structure.

Global Command and Control System-Army (GCCS-A)

Description. GCCS-A is a computer-based, strategic, operational and tactical C2 system that provides readiness reporting, mobilization and deployment of AC and RC forces and links Army C2 systems to the joint fight. It also provides detailed information on intra-theater planning and movement, and the joint interface between JC2 systems and the Army ABCS components. GCCS-A provides joint COP information to Army users and provides Army forces information to the joint COP. GCCS-A is a seamless Army extension to the joint GCCS at echelons above corps through modular division levels. GCCS uses a common open-systems hardware architecture that has a combination of government and COTS hardware and software. The GCCS-A is an integral component of the GCCS family of systems (FoS), a networked system of information systems to facilitate joint command and control.

Program Status. GCCS-A is a fielded system within the ABCS. GCCS-A upgrades are based on operational needs and technical interoperability requirements with joint GCCS, DII COE and ABCS. GCCS-A, along with the other GCCS FoS, is mandated to migrate to a net-centric C2 capability; the current program in development to accomplish this direction is the DOD JC2 capabilities initiative (see below) is projected to begin fielding the new net-centric capabilities, integrated with the GIG Net-Centric Enterprise Services (NCES), during Block 1 execution in FY08-09.

Joint Command and Control (JC2) Capabilities

Description. JC2 capability is the DOD principal C2 information technology initiative. JC2 will enable decision superiority via advanced collaborative information sharing achieved through vertical and horizontal interoperability. JC2 capabilities are defined by joint mission capability packages (MCPs). Currently defined MCPs are (1) Force Projection, (2) Force Readiness, (3) Joint Intelligence, (4) Situational Awareness, (5) Force Employment-Air and Space Operations, (6) Force Employment–Land Operations, (7) Force Employment–Maritime/Littoral Operations and (8) Force Protection. JC2 applications and functions are based on GIG enterprise services (GES) enabling shared access to Service-/agency-/joint-provided data sources. JC2 capabilities is a systems integrator, replacing Global Command and Control–Joint (GCCS-J) and Service variants as the DOD principal C2 capability supporting the National Military Command System (NMCS) and Joint Force commanders (JFCs). JC2 Capabilities integrates databases, servers, client workstations, local area networks and computer software into an open, scaleable, network-centric single architecture while maintaining Net-Centric Operations and Warfare Reference Model (NCOW RM) and NCES compliance in accordance with the Joint Technical Architecture (JTA). The JC2 capabilities initiative is dependent upon NCES in order to enable

integration and interoperability of various systems in a net-centric environment.

Program Status. The Defense Information Systems Agency (DISA) has been designated by OSD as the lead component for the JC2 Capabilities Program acquisition and is in the process of working in concert with the FoS components to achieve a Milestone A decision by the end of 1QFY06.

Mounted Battle Command on the Move (MBCOTM)

Description. MBCOTM provides the maneuver commander and his staff with a highly mobile, self-contained and reliable combat vehicle-based digital command post. The MBCOTM mission equipment platform consists of a suite of communications and digital equipment/software integrated on a combat platform to enable commanders to influence the battle while maneuvering across the battlefield. MBCOTM provides situational awareness, collaboration and a COP, which allows the commander to maintain situational understanding while moving and physically separated from a fixed command post. Future plans include variants for the HMMWV, the Bradley Fighting Vehicle and the Stryker.

Program Status. Program is currently funded for RDTE in the FY06 budget. LRIP HMMWV versions were produced in FY05 and FY06 to support OIF.

Maneuver Control System (MCS)

Description. MCS is an automated C2 system that provides a network of computer terminals to process combat information for battle staffs. This is the proponent system for the common picture (integrates information horizontally and vertically to provide friendly

and enemy unit locations). It provides automated assistance in the collection, storage, review and display of information to support the commander's decision process. Both text and map graphics are provided to the user.

Program Status. MCS has successfully completed the IOT&E and has obtained FRP decision. MCS capabilities are being transitioned as injectors and will become part of the Joint Tactical COP Workstation (JTCW) software baseline. Command Post of the Future (CPOF) capabilities will also be added to MCS as a technical insertion.

Command Post of the Future (CPOF)

Description. CPOF is an executive-level decision support system that provides situational awareness and collaborative tools to support decision making. It was designed to support parallel, synchronous, asynchronous and cross-functional planning and execution. Team members share work spaces that embody their thinking about the current situation, and collaborate to create a rich, multi-perspective, shared operational picture. CPOF enables and expands the commander-to-commander interaction in order to magnify deep collaboration—collaboration that operates at the thought process level. CPOF enables commanders to access, view,

configure and tune data, visualize workspace, and processes in ways that support their thinking. It provides the means for sharing and accessing understanding and the co-creation of actions.

Program Status. CPOF is currently a Defense Advanced Research Projects Agency (DARPA) system which will transition to the Army in Apr 06 and will become a technical insertion into MCS.

Standardized Integrated Command Post System (SICPS)

Description. SICPS is a family of systems that include the SICPS Command Post Platform (CPP), the SICPS family of tents, and the Command Center System (CCS). The centerpiece of SICPS is the CPP. The CPP is a nondevelopmental effort that integrates fielded C2 and C4ISR systems and replaces legacy SICPS platforms designed to house only two workstations. The CPP is an enabler for the Army/joint battle command systems by providing a means to enable approved Army battle command systems. This is accomplished by hosting servers associated with the ABCS 6.4 architecture, as well as servers that support GCSS-Army. Additionally, it is capable of enabling future battle command software (i.e., CPOF and JC2). Through its ability to host multiple workstations and provide classified and/or unclassified local area networks, the CPP reduces the number of digitized platforms needed to support CP operations.

Program status. SICPS is managed under PEO Command, Control and Communications Tactical (C3T). Northrop Grumman was awarded the prime contract for CPP and CCS development and SICPS tents/TMSS being procured using COTS or modified COTS nondevelopmental items. Production Representative Systems (PRS) for use in contractor and government testing were used to conduct combined DT/OT. The LRIP phase was initiated at the approved Milestone C decision in Jul 05. IOT&E is planned for 4QFY06 and FRP decision is expected in 1QFY07.

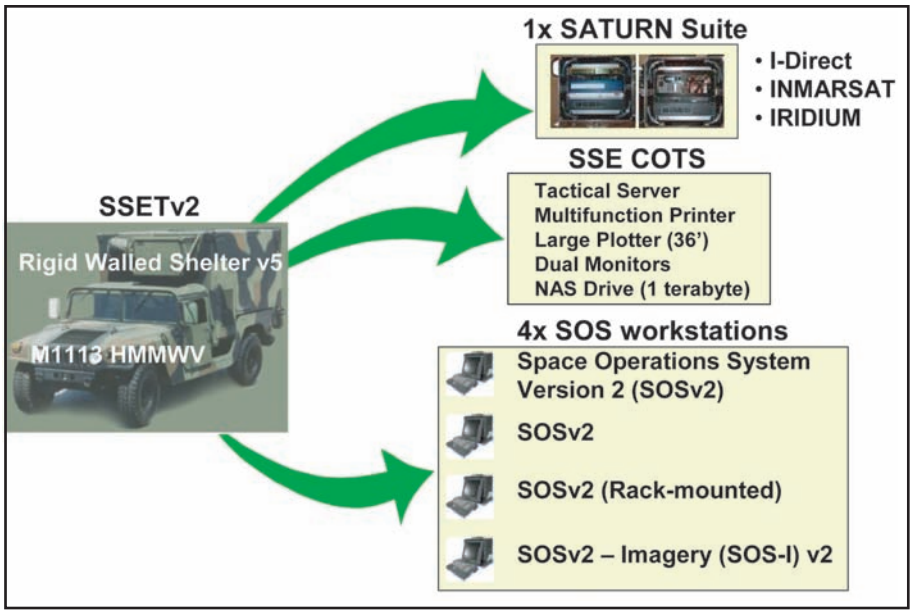
Army Airborne Command and Control System (A2C2S)

Description. A2C2S is the Army's above-the-ground battle command platform that provides the commander with a highly mobile, self-contained and reliable integrated digital command post that is integral to transforming the Army from the current to future modular force. The A2C2S, integrated on a UH-60L platform, enables the commander and his staff to traverse the battlespace while maintaining situational understanding through C4I connectivity at the decisive point on the battlefield at critical times. It provides a LOS and BLOS voice and digital communications package. This system is fielded to aviation brigades supporting divisions deployed in OIF/OEF.

Program Status. The program is currently producing LRIP aircraft platforms in FY06. Unit training is ongoing with existing aircraft fielded in 4QFY05 to support OIF. Other resources are being funded to support the installation of International Maritime Satellite (INMARSAT) onto the initial LRIP and current assets.

Space Support Enhancement Toolkit (SSET)

Description. The SSET is a mission essential item of equipment for the Space Support Element (SSE) resident within the corps and division headquarters. It provides capabilities needed by SSE to conduct space operations planning, integration and coordination. These



Program Status. The SSET is an emerging requirement that is not funded in the FY06-11 program. It has been developed through the efforts of the SMDC Space Directorate Battle Lab. In Dec 04, the Army Acquisition Executive assigned SSET system life-cycle management responsibilities to the Program Executive Office Intelligence, Electronic Warfare and Sensors(PEO IEWS).

functions aid in enabling the Joint Force commander to achieve the precision engagement, information superiority and battle command capabilities across the full spectrum of distributed ground force combat operations through better exploitation of space-based systems, products and services. The SSE approach is part of the space operational architecture supporting current and future force requirements as noted within Army doctrine, TRADOC *Pamphlet 525-3-14, Concept for Space Operations in Support of the Future Force* (updated 31 Dec 03). The SSET is currently a non-type-classified COTS/government off-the-shelf (GOTS) prototype system and has been combat tested in OEF and OIF. Employment during OEF and OIF has demonstrated that the space-based products provided by SSET-equipped teams provided enhanced C2 and situational awareness for land force commanders. It consists of a communications suite, four workstations and ancillary equipment housed in a rigid-walled shelter V5, mounted on an M1113 HMMWV. The emerging design incorporates a four-person SSE equipped with an SSET. This limited placement of personnel and equipment will help further refine space support to the tactical force.

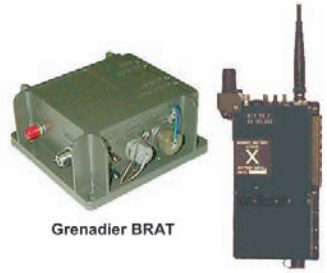
Force XXI Battle Command Brigade and Below (FBCB2)

Description. FBCB2 is a joint interoperable, digital, battle command information system for brigade level and below. FBCB2 is designed to provide mounted and dismounted combat elements with near real-time, integrated situational awareness and C2 functionality. FBCB2 enhances the ability of tactical commanders to better synchronize their forces, achieve agility and gain a sense of the battlespace through improved situational awareness and better combat awareness reporting while on the move. FBCB2 is a key component of ABCS. FBCB2 operates over both terrestrial communications networks and

SATCOM networks. The system consists of a ruggedized computer with a touch screen and keyboard in which the Soldier sees either a digital map or satellite imagery overlaid with icons representing the vehicle's location, other FBCB2/BFT vehicles, known enemy units, and objects such as minefields and bridges. FBCB2/BFT was expeditiously fielded in reduced quantities to every MACOM as well as the USMC and United Kingdom forces participating in OEF and OIF. As a result of lessons learned in OEF/OIF, the Army revised its Army battle command plan to deliver a consistent solution across the force within the next 18-24 months in order to provide partial "good enough" capabilities over time. FBCB2 requirements were refined to accelerate fielding efforts (OIF-like capability) and equip the AC and activated National Guard units to the FBCB2 Fielding/Distribution Plan, the Key Leader Option (KLO) "minus" architecture by the end of FY05; equip AC units to the full KLO architecture by FY07; equip AC units to the modular architecture in accordance with the Army Campaign Plan; and equip the National Guard units to the modular architecture by FY11.

Program Status. FBCB2 is currently funded to continue improvements in Network Operations Center re-architecture, synchronization of software releases, new satellite architecture and waveform redesign to address latency issues caused by increased OIF/OEF system demands, the completion of Type 1 encryption efforts, the development of beacon capability (Integrated Data Modem and Electronic Data Manager), dismounted vehicular product development, logistics product development, and Internet Protocol v6 development.

Grenadier BRAT (GB) and Mini-Transmitter (MTX) Blue Force Tracking (BFT) Systems



Description. GB and MTX are BFT systems that take advantage of the existing national space infrastructure. They give commanders the ability to track and receive position location information (PLI) and short brevity codes, in near real-time, from friendly forces that require a low probability of intercept/low probability of detection (LPI/LPD) C2 link. GB and MTX systems substantially enhance security and reliability through the use of LPI/LPD COBRA (collection of broadcasts from remote assets) waveforms, encryption certified by the National Security Agency, and military GPS. A space-based BFT Mission Management Center (MMC) supports GB/MTX use of the existing COBRA architecture by coordinating with national system managers and warfighting units to help collect, process and disseminate warfighter BFT data. During OEF and OIF, the GCCS successfully integrated disparate BFT systems used by different units and Services. SOF used the COBRA-based BFT systems due to the security advantages, while Coalition Forces Land Component Command (CFLCC) main formations used FBCB2. BFT systems gave operational-level commanders the most robust COP to date by substantially increasing their situational awareness.

Program Status. USASOC, USAREUR and USARSO were initially fielded 400 GBs. An additional 400 systems are currently being procured for USASOC to support ongoing real-world contingency operations. There are approximately 3,000 MTX systems produced and fielded to USSOCOM components; e.g.,

every USAF Special Operations Command airframe and deployed ground team in support of OEF/OIF has an MTX. The GB was acquired as a Warfighter Rapid Acquisition Program product, and the MTX and the MMC were developed and fielded as a result of supplemental appropriations and budget additions.

Single Channel Ground and Airborne Radio System (SINCGARS)

Description. SINCGARS provides commanders with a highly reliable, secure, easily maintained combat net radio that has both voice and data handling capability in support of C2 operations. SINCGARS, with the Internet controller, provides the communications link for the digitized force. The Advanced System Improvement Program (ASIP) models are of a reduced size and weight, providing further enhancements to operational capability in the Tactical Internet environment.

Program Status. SINCGARS continues to be the workhorse in the Army. FM Combat Net Radio in OIF/OEF and are being fielded to Active/ARNG/Reserve forces in current operations as well as supporting Army transformation.

Command and Control Summary

Army C2 and JC2 supported by fully leveraged net-centric communications and computers and ISR capabilities are at the core of realizing the required characteristics envisioned in the future force. Networked communications and intelligence packages will dramatically improve command and control, and enhance situational awareness, making it possible to achieve significant advances in tactical operations and strategic responsiveness. The Army has already made important steps towards this goal. The ABCS and the C4ISR infrastructure for the current digitized forces provide a near real-time COP to ground maneuver units and the joint forces. ABCS can also leverage theater assets such as JSTARS to increase the COP capability. In addition, the Army Command Post of the Future (CPOF) has demonstrated significant utility in current operations to improve the COP and increase situational awareness that resulted in enhanced C2. During OEF and OIF, the Army demonstrated a significant increase in combat power when it exercised these capabilities. Interoperability improvements between ABCS and joint and multinational systems have been achieved, and further improvements are planned with the Joint Requirements Oversight Council (JROCM) 161-03 Ground Force C2/SA Convergence effort, Joint Blue Force Situational Awareness (JBFSA) and Joint Battle Management Command and Control (JBMC2). The Army will continue to incorporate lessons learned from operating ABCS in developing the C4ISR infrastructure for the future force and executing the Army battle command migration strategy.

Appendix 6: Net-Centric

The Network

Concepts for network-centric warfare, full-spectrum dominance and decision superiority are driving C2 modernization efforts for the Army's current and future modular forces and the Joint Force. These concepts require a robust, modular, deployable and always capable network that provides universal access to all relevant authorities, assets and capabilities. This network consists of integrated information systems, supporting information

infrastructure and a knowledge-based force of individuals located across the entire spectrum of the battlefield from the Soldier on point, through a variety of operations and support centers in theater, to home station operations and support centers located worldwide. To achieve this level of networking, the focus is being shifted from a bottom-up to a top-down approach that develops integrated C2 network architectures designed to support battle command capabilities for the current and evolving future combat force in the JIM, full-spectrum operational environment. The Army is currently identifying baseline network capabilities for the JIM environment and will use a single Army lead for network development to enhance the current modular force and accelerate network development for the future.

Discussion of Key Net-Centric Materiel Programs

Satellite Communications (SATCOM)

Description. SATCOM systems provide a robust, flexible and seamless network capability that extends, and in some cases replaces, terrestrial capabilities with responsive, BLOS communications throughout the battlefield that permits users to access large databases necessary to support strategic, operational and tactical missions. SATCOM global connectivity supports the command and control capabilities of planning, coordinating, directing and controlling. SATCOM use is essential for the real-time direction of operations at each echelon of command. SATCOM enables tactical forces to exploit improved capabilities to coordinate fires; conduct operational maneuver on the unstructured, asymmetric battlefields of today; and assess the effects of previous operations and anticipate enemy actions. An integrated high-capacity SATCOM backbone provides reachback connectivity that allows implementation of split-based command and control and logistics support concepts. This architecture will also support interoperability with joint, coalition, commercial and civil communications networks. As a result, current and evolving modular forces will have reliable, on-demand, BLOS/NLOS communications for enhanced early warning, en route mission planning and rehearsal, and responsive CSS while maintaining a reduced footprint in theater. Reliable SATCOM enhances increased responsiveness, agility, versatility, survivability and sustainability.

Program Status. The MILSTAR satellite Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T) provides a protected (anti-jam) wideband, BLOS capability for Army modular divisions, BCTs and SBCTs. The program is currently in production and continues to be fielded. Phoenix, an SHF multiband satellite terminal, HMMWV-mounted, air-transportable system was awarded a development contract on 15 Apr 03. The first Phoenix fielding was in Jul 04. Tri-band terminals (X, C and Ku) were fielded in FY04 and FY05. A quad-band upgrade in FY06 will add Ka band. Phoenix will be fielded to Integrated Theater Signal Battalions (ITSB) FY04-08. The AN/TSC-85B and AN/TSC-93B are satellite X-band terminals used for BLOS range extension and reachback from deployed base to sustaining base in CONUS. Under the Army D Model System Life Extension Program (SLEP), all AN/TSC-93C and AN/TSC-85C terminals (67 AN/TSC-85s and 107 AN/TSC-93s) will be sustained to operate at least until 2012, including those that will be cascaded to the Army Reserves and National Guard. A cascade and sustainment effort was executed in FY04 and will continue thru FY08. AN/TSC-85 and AN/TSC-93 terminals are fielded to round out the ITSBs.

Combat Service Support (CSS) Satellite Communications (SATCOM)

Description. The CSS-SATCOM provides rapidly employed, BLOS communications-enabling hardware to logisticians at the tactical and operational levels. The program, which grew out of the Army G-4's Connect the Logistician focus area, provides COTS-based very small aperture terminals (VSAT) and a supporting global infrastructure to logistics activities integrated within and supporting the Army's modular force structure.

Program Status. With over 400 terminals in service, CSS-SATCOM has completed fielding to five divisions and 12 brigades in the AC and RC. The system is currently being fielded to the 25th ID and is aligned with the Army Campaign Plan for future fieldings. CSS-SATCOM was designated a formal program in 1QFY05 under the auspices of the Program Executive Office Enterprise Information Systems (PEO EIS).

Global Positioning System (GPS)

Description. GPS is a space-based radio position/navigation (POS/NAV) system that provides extremely accurate, continuous, all-weather, common-grid, worldwide navigation and three-dimensional positioning, velocity and timing information to land, sea, air and space users. These components are the space, ground control and user equipment segments.

Program Status. The Defense Advanced GPS Receiver (DAGR) began replacing the current Precision Lightweight GPS Receiver (PLGR) in modularizing and other high-priority units in 1QFY05. The DAGR includes the Selective Availability Anti-Spoofing Module (SAASM) and other significant improvements including size, weight and battery requirements. The PLGR will be cascaded from units fielding the DAGR to fill authorized requirements in other units. The DAGR is projected to be replaced starting in FY13 by an improved Military (M)-Code capable handheld GPS device when the associated M-Code satellite constellation and ground control stations have reached FOC.

Warfighter Information Network–Tactical (WIN-T)

Description. WIN-T is designed to provide the backbone of the tactical network, continuous and full communications-on-the-move capability at all echelons, joint and coalition voice and data services to all command posts, a flexible and dynamic task reorganization capability, and a more survivable and less complex network. WIN-T's single integrated network will provide multi-level classified joint and coalition voice and data services to all command posts. Conceptually, this is intended to eliminate the need for stovepipe (CSS-VSAT, Trojan Spirit, etc.) communications systems. WIN-T provides the key capability for on-the-move communications through a three-tiered architecture (ground, airborne, and space) that enables continuous

network connectivity. The ground layer will equip Soldiers, sensors, platforms, command posts and access nodes (signal shelters) with integrated transmission (radio) systems, switching and routing capabilities that will serve as WIN-T points of presence (POPs). The airborne layer will serve as an access node and relay by positioning transmission, switching and routing capabilities onto airborne platforms. The space layer will serve as an access node and relay by leveraging the transmission, switching and routing capabilities provided on the satellite.

Program Status. The program is currently in its SDD phase. According to the current WIN-T plan, a Milestone C decision is formally planned for Mar 06, after which it will enter LRIP. The purpose of LRIP is to procure units leading to IOT beginning in 4QFY08 and continuing through 1QFY09. The IOT would be preceded by product verification testing (contractor and government) in 2007 and 2008. The Army is presently examining how best to formulate a migration strategy from JNN to WIN-T. JNN was designed to be an immediate and quick fix to Mobile Subscriber Equipment (MSE) in order to support current rotations to OIF. While JNN provides significant near-term improvements to the current MSE, most evident in providing limited NETOPS and enhanced mobility, it does not have the capability, capacity or mobility required for the future force.

Joint Tactical Radio System (JTRS)

Description. JTRS is a family (ground, airborne and maritime domains) of common software-defined radios that provide seamless network connectivity throughout the battlefield in support of *Joint Vision 2020* objectives. JTRS is the military's affordable, mobile, high-capacity, lightweight, multiband radio system providing simultaneous voice, data and video communications. JTRS replaces 32+ currently fielded radio systems and will be a key component of the Tactical Internet and GIG using a family of network waveform applications. The Army is the executive agent for the JTRS program. Additionally, the Army is responsible for two (Clusters 1 and 5) of the four primary cluster efforts (Clusters 1, 2, 5 and AMF). Cluster 1 is developing the ground vehicular and airborne rotary-wing aviation form factors, while Cluster 5 is developing the handheld, manpack and small-fit form factors.

Program Status. Cluster 1: The JTRS ORD was updated in Apr 03 to Version 3.2. JTRS Cluster 1 is in the SDD phase. Cluster 5: JTRS Cluster 5 received a successful Milestone B decision on 26 Apr 04 and awarded an SDD contract to GDDS on 16 July 04. The JTRS Joint Program Executive Office (JPEO) has completed a program assessment and proposed a restructure for both programs. In addition, the requirement/user community is developing baseline, required capabilities that will support an incremental acquisition strategy. Upon completion of the assessment and requirements definition, the programs will return to the Defense Acquisition Board for approval of the Acquisition Program Baseline, program schedule, etc.

Bridge-to-the-Future Networks (BFN)

Description. BFN is an enabling component within the Army's LandWarNet concept of operations (CONOPS) for describing the Army's near-term vision for providing and operating within a net-centric environment to the lowest tactical levels. The Army's LandWarNet CONOPS is the Army's contribution to the GIG—consisting of all globally interconnected, end-to-end set of Army information capabilities, associated processes and personnel—for collecting, processing, storing,

disseminating and managing information on demand, which supports warfighters, policy makers and support personnel. It includes all Army (owned and leased) and leveraged DOD/joint communications and computing systems and services, software (including applications), data security services, and other associated services. BFN is the Army's bridging strategy to deliver increasing net-centric capabilities into the current force today, and will be followed by the initial transition to the WIN-T capability. Capability enhancements within the Army's BFN strategy are increased voice, data and video services that are joint network ready and supports the Army's modular designs. The BFN will provide the current force with a state-of-the-art COTS communications backbone network (high-speed and high-capacity) that will enable them to exchange information (voice, data and video) throughout the tactical corps and into the sustaining base. The objective of the BFN is to incrementally insert increased capability, COTS solutions to the Army's current force to satisfy existing capability gaps. BFN capability increments build off the recapitalization of the current MSE and Tri-Services Tactical Communications (TRI-TAC) tactical communications systems. The Army's BFN CPD fuses the Army's Joint Network Node (JNN), Connect the Logistician–CSS, and intelligence Trojan Spirit initiatives into a single strategy to deliver increased capabilities to the warfighter today. The BFN capability increments build off of the existing Area Common User System Modernization Plan (ACUS MP) and recapitalization of the current MSE and TRI-TAC tactical communications systems.

Program Status. The BFN Capabilities Production Document (CPD) was validated by the AROC on 7 Oct 04. An updated requirement (Increment 1) was signed by Headquarters TRADOC on 15 Sep 05 and is currently going through Army staffing. The pursuit of COTS solutions facilitates rapid delivery of increased capability to the current modular force and supported Combatant Commanders. Enhanced capabilities will be defined and documented within future increments to the BFN CPD, and potentially a CDD.

Joint Network Node (JNN)

Description. JNN is the Army's modernization of the tactical battlefields transport network and provides interconnectivity with Army and joint units and ties in NCES via the Defense Information Systems Network. Spiraling JNN into the force will provide commercial satellite augmentation to Army MILSATCOM, Internet Protocol (IP)-based services, Voice over IP (VoIP) augmentation to Defense Switched Network (DSN), unclassified/classified Internet down to the battalion level, secure digital telephone down to brigade level, and situational awareness. JNN provides a high-speed, high-capacity network communications backbone connection at the quick halt that is joint-capable, supports the warfighter's rapid movement and simultaneous operations, and disseminates information at all levels of security. Key items of the JNN architecture are SATCOM hub node, JNN and battalion command post (Ku/Ka SATCOM) node, as well as embedded local area network components. JNN is to be designated a program of record under the Area Common User System Modernization Plan (ACUS MP).

Program Status. In recognition of the aggressive schedule requirements and the needs of the current force warfighter for expeditious delivery of JNN-N capabilities, the Army Acquisition Executive directed a Milestone C decision review be executed in 1Q-2QFY06, followed by contract award in 2QFY06. Failure to execute these events in this time frame will adversely impact FY07 modularity fielding requirements identified in

the Army force structure baseline. JNN fielding to the 1st Cavalry Division and the 25th ID began in Sep 05.

Joint Network Management Systems (JNMS)

Description. The JNMS is a Combatant Commander (COCOM) and joint task force (JTFs) communications planning and management system. JNMS provides communication planners with the capabilities to conduct planning, engineering and monitoring for communications systems and networks supporting joint operations. It will plan and manage this diverse array of legacy and advanced information technology (IT) solutions that make up the joint battlespace—from fixed Defense Information Switched Network (DISN) infrastructure, across tactical satellite systems and into Service-unique tactical systems. The communications systems in support of the JTF include military deployable communications and DISN to host nation communications infrastructure to allow JNMS to support intra-COCOM, COCOM-to-subordinate Service component, COCOM-to-JTF(s) and JTF-to-Service task force network planning and management.

JNMS will manage the converged voice, video and data network that will traverse the modern battlefield, and consists of an architecture that supports both military legacy networks and the evolution to commercially based networking technologies. JNMS will be an open-system, standards-based architecture that is modular by design to allow easy integration of new technology and to adapt to different operational requirements, making maximum use of the best COTS and GOTS applications available, integrated into a package that is user friendly, easy to train, and which works in a distributed environment over constrained bandwidth.

Program Status. Program manager is currently developing a fielding/delivery schedule to support the validated system architecture for above-division formations. Current programmed funding provides for the procurement and delivery of the validated systems AAO of 56.

ISYSCON Tactical Internet Management System (TIMS)

Description. TIMS is the Army's communication planning and engineering system for current, future and contingency operations. TIMS performs network management functions critical for the ABCS and FBCB2 operations and provides command and control, planning and engineering of the Army's tactical networks, from battalion through theater, in support of joint and combined operations. TIMS is a C2 enabler that will support the full spectrum of military operations.

Program Status. The program is currently providing ABCS and network system management hardware/software tools to converting modular forces in accordance with the Army Campaign Plan and the Army Priority List. The program is currently funded to deliver required quantities to converting and FY06 and 07 deploying OEF and OIF units.

Net-Centric Summary

The Net-Centric Operational Environment (NCOE) implementation effort has the overall objective of creating a seamless, integrated net-centric capability to the forward edge of the battlespace, enabling full-spectrum dominance. The net-centric environment is a Joint Force framework for full human and technical connectivity that allows all DOD users and mission partners to share the information they need, when they need it, in a form they can

understand and act on with confidence; and protects information from those who should not have it. The NCOE has the potential to revolutionize joint operations by optimizing and even transforming how information and knowledge are generated, presented and used throughout the Joint Force and our mission partners.

The NCOE is more than a set of networked technical capabilities. The NCOE must provide the Joint Force with pervasive knowledge through the full integration of knowledge management, network management and information assurance.

Annex D Summary

Annex D of the *2006 Army Modernization Plan* provides an overview of key Army materiel programs funded in PB07. These programs are framed within the six joint functional concept/capability categories used by the JCIDS process to analyze Joint Force future requirements and guide Army and other Service modernization efforts towards those requirements as they emerge. Other annexes in the *2006 Modernization Plan* examine modernization paths of doctrine, training, installations, personnel and force structure.